# **Regional Haze**

# State Implementation Plan Supplement

<March> 2012



# Introduction

The state of Minnesota is home to two federal Class I areas, the Boundary Waters Canoe Area Wilderness (BWCAW) and Voyageurs National Park. In compliance with the Regional Haze Rule promulgated in 1999, the Minnesota Pollution Control Agency (MPCA) submitted to the U.S. Environmental Protection Agency (EPA) a State Implementation Plan (SIP) to reduce haze in the Class I areas in December 2009.

The December 2009 submittal contained Best Available Retrofit Technology (BART) determinations for several electric generating units (EGUs) and taconite facilities, in accordance with 40 CFR § 51.308(e). However, these BART determinations did not all have associated emission limits, due to a lack of available data. In addition, they were not yet enforceable. On December 20, 2010, the MPCA received a letter from EPA Region 5 indicating that, pursuant to the requirements of Section 110 of the Clean Air Act, BART limits must be established in an enforceable form before EPA can approve Minnesota's Regional Haze SIP.

This submittal contains additional BART information and enforceable documents in fulfillment of the requirements of Section 110 of the Clean Air Act. In addition, this submittal contains a change in Minnesota's strategy for the Northeast Minnesota Plan, part of the long term strategy to improve visibility under 40 CFR § 51.308(d)(3)).

#### **BART for Electric Generating Units**

The MPCA's December 2009 Regional Haze SIP submittal included BART determinations and associated emission limits for five power plants. These plants are shown in the table below:

Facility Name	Subject-to-BART Unit(s)
Minnesota Power – Taconite Harbor	EU 003
Minnesota Power – Boswell Energy Center	EU 003
Northshore Mining Company – Silver Bay Power	EU 002
Rochester Public Utilities – Silver Lake	EU 003, EU 004
Xcel Energy – Sherco	EU 001, EU 002

However, the emission limits were not included in enforceable documents, and therefore have not yet been acted on by EPA. This supplemental SIP makes changes to the BART determinations for power plants in Minnesota.

The MPCA's initial intent was to determine that the Clean Air Interstate Rule (CAIR) was equivalent to BART for the power plants in Minnesota. EPA had determined that emissions reductions from CAIR would result in greater reasonable progress towards visibility goals than site-specific application of BART. Therefore, states could essentially "substitute" the participation of the state's power plants in CAIR for individual BART determinations. The initial draft Minnesota SIP, which was placed on notice in February 2008, included this CAIR=BART determination. One of the reasons that the MPCA felt comfortable making this determination is that many emission reductions were already occurring in preparation for CAIR.

After the completion of the public notice period, the DC Circuit Court of Appeals remanded the CAIR program to EPA. Part of that action questioned whether Minnesota was appropriately included in CAIR, and EPA subsequently removed Minnesota from the CAIR program.

Because of the removal of Minnesota from CAIR, the MPCA made individual BART determinations for the subject facilities. These BART determinations were described in the initial SIP submittal, but the emission limits were not included in enforceable documents at that time. In general, these BART determinations simply expressed emission limits from control projects that were being undertaken in planning for CAIR.

Minnesota is now included in the Cross-State Air Pollution Rule, also known as the Transport Rule (TR), as described in 40 CFR § 52.1240 and 40 CFR § 52.1241. EPA has committed to doing a rulemaking to determine if the emission reductions provided by the Transport Rule are equivalent or better than applying BART to power plants on an individual basis.

The emission budgets proposed for the TR are very similar to those proposed by EPA for CAIR. For example, under CAIR, Minnesota would have had an annual  $NO_X$  budget of 31,443 from 2009 through 2014, and 26,203 in 2015 and later. Under TR, Minnesota's annual  $NO_X$  budget is 28,977. CAIR also proposed to use Title IV acid rain allowances, on a 2:1 basis, to reduce  $SO_2$  emissions. Minnesota's Title IV allocation is 97,181, so the annual  $SO_2$  budget under CAIR would have been 48,950 tons per year. Minnesota's  $SO_2$  allocation under TR is 41,139 tons per year.

Because the TR is as stringent as CAIR, it is reasonable to assume that EPA's rulemaking will determine that the emission reductions from TR will be equivalent or better than those provided by source-specific BART. Therefore, the MPCA is determining that Transport Rule=BART for Minnesota. Rather than complying with the specific BART determinations made in the initial SIP submittal, Minnesota's subject-to-BART power plants simply need to comply with their obligations under the Transport Rule in order to meet the BART obligations.

The MPCA believes that this determination will not have an adverse impact on the emission reductions or air quality expected due to the application of BART. The majority of the MPCA's BART determinations for EGUs were based on the technology that facilities were planning to install in order to comply with the Clean Air Interstate Rule. The MPCA believes that each facility will continue to have an incentive to operate the controls in order to comply with the Transport Rule.

#### **BART for Taconite Facilities**

In the submittal of December 2009, the MPCA determined that, generally, BART for the taconite facilities consisted of operation of existing scrubbers to control sulfur dioxide ( $SO_2$ ) emissions, good combustion practices to control nitrogen oxides ( $NO_X$ ) emissions, and continued implementation of the taconite Maximum Achievable Control Technology (MACT) standard for control of particulate matter (PM) emissions.

However, due to a lack of good data on emissions at the taconite facilities, the MPCA was unable to develop emission limits to correspond with the BART determinations  $NO_X$  at all cases and for  $SO_2$  in the case of facilities that burn higher sulfur fuels. The MPCA entered into Administrative Orders with the facilities, which required the facilities to do increased monitoring of their emissions and report emissions to the MPCA.

The MPCA felt that at least one year of emissions data was needed from each facility in order to determine the appropriate BART limits. After receiving enough emissions data from the facilities, the MPCA analyzed the emissions to determine the BART limits.

The general approach to setting the BART limits was to focus on a recent set of at least 150 hours of data. A confidence interval was then constructed, and the BART limit was set at the 99% upper prediction limit of the confidence interval. Table 1 lists the subject-to-BART unit(s) at each facility, the BART determination for  $SO_2$  and  $NO_X$ , and the resulting emission limit.

Memos describing the process for setting the BART emission limits for each facility, including more detailed information on the statistical analysis, are included as Appendix 1. Administrative Orders making the BART limits for all three pollutants enforceable are included in Appendix 2.

The MPCA is requesting that EPA approve the attached Administrative Orders in Appendix 2, which contain BART emission limits and compliance methods, into Minnesota's SIP. The MPCA also requests that EPA not incorporate the Administrative Orders requiring additional emissions monitoring into the SIP, as those Orders represented an interim step towards BART implementation.

Termination of the prior Orders by Consent is included in this SIP revision as Appendix 3. The Orders in this supplemental SIP contain all necessary requirements for ongoing implementation of BART.

#### United Taconite

This supplemental SIP revision includes a slight change in approach for BART at United Taconite, due to a modification at the facility. In August 2010, the MPCA processed a permit amendment for United Taconite. The permit amendment allowed the concentrator and pellet plant at United Taconite to be modified in order to increase plant production from 5.3 million long tons of pellets annually to 6.0 million long tons. It also allowed for the use of solid fuels on Line 1, which had previously been fired only with natural gas. This authorization for solid fuels includes the testing of alternative fuels, such as a wood-based fuel.

The change in the facility made it difficult to determine the appropriate BART limit. The MPCA determined that it was appropriate to make an initial finding of emission limits corresponding to the BART determination in the initial SIP submittal, based on the configuration of the facility at that time.

The permit amendment requires that, within 120 days after receiving notification of the BART emission limits set by the MPCA, United Taconite must undertake one of three options. The options are: 1) submit a permit application to MPCA to incorporate the BART limits; 2) submit a permit application that proposes emission limits for a BART alternative that provides greater controls of visibility impairing pollutants than the BART determination; or 3) submit an updated BART analysis for both Line 1 and Line 2 for the facility as changed by the permit amendment. The MPCA notified United Taconite of the BART limits on September 22, 2011.

On December 8, 2011, United Taconite proposed that the  $NO_X$  and  $SO_2$  limits set as part of the above-mentioned permit amendment be incorporated as the BART limits for the facility. As described in the memo in Appendix 1, the MPCA found that these limits provided greater annual reductions of  $NO_X$  and  $SO_2$  than would be provided by the MPCA's initial BART limits. Therefore, the MPCA is proposing to accept these as the BART limits for United Taconite, with the addition of a shorter averaging time for the  $NO_X$  emissions at the facility.

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December 2011

Table 1: Taconite BART Determinations and Emission Limits for  $NO_{\chi}$  and  $SO_{2^{\prime}}$ 

Facility	Unit		Stack Vent	NO <sub>x</sub> BART	NO <sub>x</sub> BART Limit	SO <sub>2</sub> BART	SO <sub>2</sub> BART Limit
Arcelor Mittal	Indurating Furnace	E0026	SV014, SV015, SV016, SV017	Good combustion practices, low NO <sub>X</sub> burners in the pre-heat zone, furnace energy efficiency project (2007)	1018.0 lbs/hr	Existing wet scrubber	0.165 lbs/LT
Hibbing Taconite	Line 1 Pelletizing Furnace	EU020	SV021, SV022, SV023, SV024	Good combustion practices, furnace energy efficiency projects (2005 and 2006)	447.4 lbs/hr	Existing wet scrubber	0.207 lbs/LT
	Line 2 Pelletizing Furnace	EU021	SV025, SV026, SV027, SV028	Good combustion practices, furnace energy efficiency projects (2005 and 2006)	571.7 lbs/hr	Existing wet scrubber	0.207 lbs/LT
	Line 3 Pelletizing Furnace	EU022	SV029, SV030, SV031, SV032	Good combustion practices, furnace energy efficiency projects (2005 and 2006)	338.3 lbs/hr	Existing wet scrubber	0.207 lbs/LT
Northshore Mining	Indurating Furnace 11	EU100, EU104	SV101, · SV102, SV103, SV104, SV105	Good combustion practices	115.5 lbs/hr	Existing wet scrubber	0.0651 lbs/LT
,	Indurating Furnace 12	EU110, EU114	SV111, SV112, SV113, SV114, SV115	Good combustion practices	115.5 lbs/hr	Existing wet scrubber	0.0651 lbs/LT
	Process Boiler #1 Process Boiler #2	EU003 EU004	SV003	Existing controls Existing controls	0.17 lbs/ MMBtu 0.17 lbs/ MMBtu	N/A N/A	N/A N/A
United Taconite	Line 1 Pellet Induration Line 2 Pellet	EU040 EU042	SV046 SV048,	Good combustion practices, past heat recuperation project Good combustion practices	4.5 tons per day 10.1 tons per	Existing wet scrubber Existing wet	day rolling sum 197 tons, 30-
						blending	0

December 2011

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Facility	Unit		Stack Vent	NO <sub>x</sub> BART	NO <sub>x</sub> BART	SO <sub>2</sub> BART	SO <sub>2</sub> BART Limit
					Limit	-	
U.S. Steel -	Phase II Grate-Kiln	EU030	SV051	Existing combustion controls and	12.35 tons	Existing wet	2.71 tons per
Keetac	Pelletizing		,	fuel blending	per day	scrubber	day
	Furnace						
U.S. Steel –	Line 3 Indurating	EU225	SV103	Good combustion practices, fuel	7.85 tons per	Existing controls	1.28 tons per
Minntac	Furnace			blending	day		day
	Line 4 Indurating	EU261	SV118	Good combustion practices, fuel	9.85 tons per	Existing controls	1.10 tons per
	Furnace			blending, low-NO <sub>x</sub> burners in the	day		day
				preheat zone			
	Line 5 Indurating	EU282	SV127	Good combustion practices, fuel	9.46 tons per	Existing controls	1.10 tons per
	Furnace			blending, low-NO <sub>x</sub> burners in the	day		day
				preheat zone			
	Line 6 Indurating	EU315	SV144	Good combustion practices, fuel	7.14 tons per	Existing controls	1.47 tons per
	Furnace			blending, low-NO <sub>x</sub> burners in the	day	,	day
				preheat zone			
	Line 7 Indurating	EU334	SV151	Good combustion practices, fuel	5.51 tons per	Existing controls	1.61 tons per
	Furnace			blending, low-NO <sub>x</sub> burners in the	day		day
				preheat zone			

# Long Term Strategy: Northeast Minnesota Plan

The December 2009 SIP submittal includes, as part of the long term strategy, the Northeast Minnesota Plan to reduce emissions of  $SO_2$  and  $NO_X$  from large sources in the six county (St. Louis, Lake, Cook, Carlton, Itasca, and Koochiching) northeast Minnesota area.

The Northeast Minnesota Plan has two main components. The first is a goal of a 30% reduction in combined  $SO_2$  and  $NO_X$  emissions from larger sources, those that emit over 100 tons per year of either pollutant, by 2018 as compared to a baseline year of 2002. There is an interim goal of a 20% reduction by 2012. As of 2009, the most recent year for which emission inventory data is available, emissions were down by 39%. Based on projections at the beginning of 2011, it appears Minnesota will meet both the 20% by 2012 and 30% by 2018 goals.

The second part of the Northeast Minnesota Plan laid out a strategy for pilot testing emission controls on the taconite plants. Based on the BART analyses provided by the taconite facilities, the MPCA determined that the six taconite facilities were likely to be undercontrolled. Very few emission control technologies have been demonstrated on the indurating furnaces, the main source of emissions at the taconite facilities. Therefore, the Northeast Minnesota Plan envisioned that the taconite facilities would investigate control measures and pollution prevention practices through pilot testing, and report to MPCA on the feasibility and cost effectiveness of the controls. Any reasonable controls would then be installed. This was intended to evolve the controls available for these facilities, as no other driver for reductions appeared to be likely.

The basic timeline envisioned for the pilot testing was that the taconite facilities would conduct the pilot testing during the end of 2011 and through 2012. They would then report to the MPCA on the results in early 2013, and the MPCA would review those reports. Any control measures that were determined to be reasonable using the five factors set forth in the Regional Haze rule would be required, and the MPCA would develop enforceable documents for those reductions from mid-2013 to mid-2014, with controls being installed in 2015 and onward.

However, since the original SIP submittal, EPA has issued two new National Ambient Air Quality Standards (NAAQS), for  $SO_2$  and  $NO_2$ , which appear able to drive more stringent controls and on a faster timeline than envisioned by the pilot testing. Therefore, the MPCA is reconsidering the future progress of emission reductions from the taconite industry. We believe efforts to demonstrate compliance with new federal standards will result in appropriate evolution of control technologies and other practices that reduce emissions and meet the overall objective of the Northeast Minnesota Plan.

Assuming additional emission controls are implemented in order to meet new ambient air standards and other requirements, pilot testing of additional controls should not be necessary. Therefore, the MPCA is working with the taconite facilities to ensure each facility will be able to demonstrate compliance with the NAAQS for NO<sub>2</sub>, and SO<sub>2</sub> in a time frame based on EPA's attainment date for the new one-hour standards.

The Administrative Orders in Appendix 2 contain, in addition to the BART emission limits, requirements for modeling. Each facility must provide to MPCA a modeling protocol describing how modeling will be

conducted for  $NO_X$  and  $SO_2$  emissions. The Order then goes on to require that each facility provide, by the end of 2012, the following information:

- Modeling that demonstrates compliance with the one-hour standards;
- Proposed emission limits that result in modeled compliance;
- A description of the work practices or controls that must be implemented to meet the emission limits; and
- A schedule for implementation which ensures that they will be in place and the emission limits achieved by June 30, 2017.

The MPCA is substituting this NAAQS based strategy for the pilot testing strategy laid out in the original SIP submittal. The requirements to demonstrate attainment with the NAAQS for  $NO_X$  and  $SO_2$  standards sets a bright line goal for emission reductions. Ultimately, the MPCA believes that this NAAQS strategy will result in the demonstration of emission control technologies that work well at taconite facilities, and will result in greater emission reductions more quickly than envisioned under the pilot testing strategy.

<sup>&</sup>lt;sup>1</sup> In some cases, MPCA already has a modeling protocol in house and therefore the Order does not require an additional protocol.

# **Appendix 1: BART Determination Memos**

DEPARTMENT: POT LITTO

POLLUTION CONTROL AGENCY

STATE OF MINNESOTA Office Memorandum

DATE:

November 30, 2011

TO:

AQD File No. 257

(Delta ID No. 13700062)

FROM:

Hongming Jiang

Catherine Neuschler

Air Quality Permits Section

Air Assessment and Environmental Data Management Section

Industrial Division

**Environmental Analysis and Outcomes Division** 

PHONE:

651-757-2467

651-757-2607

SUBJECT:

Nitrogen Oxides BART Limits for ArcelorMittal Steel Company

This memo was prepared to provide the documentation of the MPCA's  $NO_X$  BART limit determination based on the technical review performed by MPCA staff. EPA's approval of the Regional Haze State Implementation Plan (SIP) for Minnesota is needed for the MPCA's BART determination to become effective.

#### 1. General Information

#### 1.1 Applicant and Stationary Source Location:

Applicant/Mailing Address	Stationary Source (SIC: 1011)/Address
ArcelorMittal Steel USA	ArcelorMittal Minorca Mine Inc.
1 South Dearborn Street	5950 Old Highway 53 North
Chicago, IL 60603	Virginia, MN, St. Louis County
Contact: Ms. Jaime Baggenstoss	s, Phone: (218) 749-5910 x283

# 1.2 Description of the Facility

ArcelorMittal Minorca Mine Inc. (Arcelor) owns and operates a taconite pellet production plant. There are three main areas where emissions are created: the mine, tailings basin and pellet plant. Arcelor makes fully fluxed pellets using one straight grate furnace.

The major steps in taconite pellet production include taconite ore mining, crushing, grinding, concentrating, agglomerating, and indurating. The larger sources of air emissions at Arcelor are from the indurating furnace operations and from mining activities, with lesser amounts from other processing operations and fugitive dust sources, including haul roads and the tailings basin.

Arcelor's pellet plant has one Dravo indurating furnace. It burns a maximum of 370 MMBtu/hr of natural gas and is capable of handling 400 tons of pellets per hour.

# 2. Regulatory and/or Statutory Basis

#### 2.1 Overview of Visibility, Regional Haze, and Best Available Retrofit Technology Program

The U.S. EPA's 1999 Regional Haze Rule singles out certain older emission sources that have not been regulated under other provisions of the Clean Air Act for additional controls. The MPCA is required to determine Best Available Retrofit Technology (BART) for these older sources that contribute to visibility impairment in Class I Areas to install Best Available Retrofit Technology (BART). On July 6, 2005, U.S. EPA published a revised final rule, including 40 CFR 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which older sources may need to install BART and for determining BART.

The MPCA is required to determine BART for each source subject to BART based on an analysis of the best system of continuous emission control technology available and associated emission reductions achievable. The analysis must take into consideration the technology available, the costs of compliance, the energy and non-air quality environmental impacts, any pollution control equipment in use at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from use of the technology.

Further discussion of the regulatory basis for this determination can be found in the MPCA's December 2009 Regional Haze State Implementation Plan submittal, in Appendix 9.3.

# 2.2 Affected Units

The unit for which the MPCA must determine BART and establish a NO<sub>X</sub> BART limit consistent with that determination is:

Emission Unit Name	EU Number <sup>1</sup>	Control Equipment & Stack Numbers <sup>2</sup>
Indurating Furnace	EU026	SV014, SV015, SV016, SV017

# 2.3 The BART Determination

The MPCA's  $NO_X$  BART determination for this unit, as documented in Appendix 9.3 of the December 2009 Regional Haze SIP submittal, is good combustion practices, past installation of Low  $NO_X$  Burners in the preheat zone and implementation of furnace energy efficiency projects in early 2008. However, due to the lack of sufficient emissions data representing the range of operating conditions that influence emissions, the MPCA did not set an emission limit at the time of making the BART determination.

Instead, the MPCA and Arcelor entered into an Administrative Order, under which Arcelor provided additional  $NO_X$  emission information to the MPCA.

# 2.4 MPCA Determination of the BART Limit

The MPCA reviewed the  $NO_X$  emission information provided by Arcelor. The MPCA focused analysis on a set of 157 hourly  $NO_X$  emission data points collected in March 2008. Under the previously mentioned Administrative Order, Arcelor was required to collect "a minimum of 150 one-hour data points under the range of [furnace] operating parameters that influence  $NO_X$  emissions. The range of each operating parameter during testing should be representative of furnace's operating range for the parameters in the 12 months previous to testing." This requirement was to ensure that the emissions data collected was appropriately representative of the range of operating conditions for the furnace. The data was collected through simultaneous testing of each of the four furnace stacks, and continuously measured data was used to calculate four 15-minute averages for each hour. Then, an hourly average level was calculated for each hour.

The process of calculating the BART limit for Arcelor's indurating furnace began by constructing a 99% confidence interval and taking the upper prediction level. The MPCA believes the use of a 99% upper predictive level for setting the limit is appropriate, due to the need for limits to be met during all operating conditions, including during times of startup, shutdown, and malfunction.

<sup>&</sup>lt;sup>1</sup> The MPCA organizes conditions and illustrates associations in its permits using the Emission Unit (EU), Control Equipment (CE), and Stack/Vent (SV) numbers.

<sup>&</sup>lt;sup>2</sup> The indurating furnace has no control equipment for NO<sub>X</sub> emissions.

The example calculation below shows the 99% upper prediction level:

Mean of 30 data points = 
$$\overline{X}$$
 +  $[2.608 \times \sigma \times \sqrt{(\frac{1}{30} + \frac{1}{157})}]$ 

- Where  $\bar{X}$  and  $\sigma$  are, respectively, the mean and standard deviation of the sample of 157 hourly-averaged NO<sub>X</sub> data points in the 2008 testing;
- The value 2.608 is the 2-tail percentage point of the t-distribution with a level of significance of 0.01 and 156 degrees of freedom; and
- $\sqrt{(\frac{1}{30} + \frac{1}{157})}$  is used to relate the sample sizes for the intended compliance test and the 2008 data set.

The table below shows the descriptive statistics for the sample data, taken during March 2008.

Arcelor Mittal NO <sub>x</sub> Stac	k Test Values (in lbs/hour)
# Data Points	157
Mean	994.1
St Dev	31.2
Max Value	1060.5
Min Value	909.4
99% Interval UPL	1010.3

The MPCA conducted additional analysis in order to help alleviate concerns that any one stack test, even an extended stack test, cannot capture all anticipated furnace operating conditions. This was done through the use of bootstrapping, a resampling technique designed to replicate the taking of multiple samples of the same size from a population. This technique uses the 157 data points as a representative population, from which multiple samples of 30 data points are drawn. A random number generator was used to select the hourly data points used in constructing each 30 data point sample. A total of 2000 sets of 30 hourly data points were generated. The mean of each 30 point data set was then used to make a new, larger, sample of 2000 data points to represent the overall "population" of potential emission levels. This was repeated several times, both in Excel and using the R statistical package.

Each of the surrogate populations thus created had a different standard error. Standard error is the standard deviation of a summary statistic, or a measure of the precision of the estimate. So, in essence, the variability of the standard error for each of these surrogate populations gives a sense of how much the sample mean may differ from the "true" or population mean. In the bootstrapping technique, the standard error of a 30 point data set built from the new surrogate population (built from the mean of each of 2000 randomly selected 30 data point sample sets) ranged from 5.670 to 9.269.

The MPCA then looked at this highest standard error, and used that standard error (se) and the mean of the original 157 data point sample to develop an additional 99% UPL. Because of the large number of data points, this was calculated with a z-statistic, rather than the t-statistic used above. The z-statistic at  $\alpha = 0.01$  is 2.576.

This calculation is:  $\bar{X} + [2.576 \times se]$ . For the data from Arcelor, this is: 994.1 + [2.576  $\times$  9.269], which results in a value of 1018.0.

The MPCA also looked at emissions information from three-hour compliance stack tests conducted from 2000 through 2009. These data further support the BART limit, as all would have demonstrated compliance with the limit established.

Stack Test Date	Furnace Average Emission Rate (lbs/hr)
June 2000	853
February 2001	537
January 2002	821
June 2003	726
June 2005	756
June 2007	762
March/April 2009	812

After reviewing stack test data provided by ArcelorMittal, the MPCA has determined that an appropriate BART  $NO_X$  limit is 1018.0 lbs/hour. This limit is for all four stacks from the indurating furnace combined, and is a 30-day rolling average.

Compliance is to be determined through  $NO_x$  performance testing, simultaneously measured for 30 hourly data points. The MPCA is requiring this longer stack testing in order to ensure that the sample is sufficiently representative and long enough to capture periods of both higher and lower emissions, in order to ensure compliance.

		NOx lbs/hour	NOx lbs/hour		•		
JD	Timestamp	(Arcelor)	(MPCA)				
1	3/12/08 0:30		. 1037.4		Descriptive Statistic	s	
. 2	3/12/08 1:30	1013.4	1013.2		Arcelor Data	MPCA Data	a
3	3/12/08 2:30	1013.9	1013.7	Averag	ge 99-	4.1	980.
4	3/12/08 3:30	1026.6	1026.5	St De	e <b>v</b> 3:	1.2	50.
5	3/12/08 4:30	1043.1	1042.9	Ma	nx 106	0.5	1060.
6	3/12/08 5:30	1048.9	1048.7	M	in 909	9.4	732.
7	3/12/08 6:30	1033.1	1033.0	t <sub>0.05,</sub>	<sub>s1</sub> . 1.9	75	1.97
. 8			1006.4	UPL 95	-		1000.19
9							2.60
			976.6	t <sub>0.01</sub> ,	-		
10			973.8	UPL 99	% 1010.3	140	1006.57
· 11			1042.9				
12			1026.9	_			
13			912.5		rting Data from Compli		
14	3/12/08 13:30	1001.1	838.9	Test Date and Time	Stack and Run	NO <sub>x</sub> Emission Rate	e, ibs/hr
15	3/12/08 14:30	983.7	983.5	. June 2000	Furnace Average	853.0	
16	3/12/08 15:30	959.0	959.8		Stack A		
17	3/12/08 16:30	.953.0	952.8	06/27/01 0830-1015	Ru	n 1 144.5	
18	3/12/08 17:30	956.8	894.0	06/27/01 1105-1213	Ru	п 2 145.3	
19	3/13/08 0:30	991.4	991.2	06/27/01 1305-1412	Ro	n 3 154.8	
20	3/13/08 1:30	1019.4	1019.3		Stack B		
21	3/13/08 2:30	1021.6	1021.4	06/27/01 0830-1015	Ru	n 1 176,7	
22	3/13/08 3:30	1006.8	1006.7	06/27/01 1105-1213	Ru	n 2 213.8	
23	3/13/08 4:30	986.7	986.6	06/27/01 1305-1412	Ru	n 3 181.8	
24	3/13/08 5:30	977.1	977.0		Stack C		
25	3/13/08 6:30	926.2	926.1	06/27/01 0830-1015	Ru	n 1 218.3	
26			983.4	06/27/01 1105-1213	Ru	n 2 218.5	
27			998.6	06/27/01 1305-1412	Ru	п 3 222.7	
28			993.2	,,	Stack D		
29			964.5	06/27/01 0830-1015	Ru	n 1 301.1	
30			732.1	06/27/01 1105-1213	Ru		
31			995.0	06/27/01 1305-1412	Ru		
32			976.2	00/27/02 2303-2422	11.0	257.0	
33			989.9	February 2001	Furnace Average	537.0	
34	, .		961.7	Tentual y 2001	Stack A	337.0	
35			975.3	02/15/01 0915-1015	- Ru	л 1 42.9	
36			1032.4		Ru		
				02/15/01 1030-1130	· Ru		
97			1036.8	02/15/01 1145-1245		(13 32.7	
38	3/13/08 19:30		1002.2	00 (15 (04 0015 1045	Stack B	- 1 017	
39			1012.4	02/15/01 0915-1015		n 1 94.7	
40			1007.3	02/15/01 1030-1130	Rui		
41	3/13/08 22:30		1022.5	02/15/01 1145-1245	Rui	n 3 61.9	
42			1060.4		Stack C		
43	3/14/08 0:30		1021.2	02/15/01 0915-1015	. Rui		
44				02/15/01 1030-1130	Rui		
45	3/14/08 2:30		1004.1	02/15/01 1145-1245	Rui	n 3 170.6	
46		993.7	993.5		Stack D		
47	3/14/08 4:30	975.4	975.3	02/15/01 0915-1015	Rui		
48		987.7	987,6	02/15/01 1030-1130	, Rui		
49			1011.0	02/15/01 1145-1245	Rui	n 3 256.4	
50			948,1				
51		1000.7	835.4	January 2002	Furnace Average	821	
52		988.7	899,5		Stack A		
53	3/14/08 10:30	935.2	935.0	1/23/2002 1040 - 1139	· Rui	n 1 109.1	
54	3/14/08 11:30	977.9	977.8	1/23/2002 1147 - 1246	Rui		
55	3/14/08 18:45	958.1	958.0	1/23/2002 1255 - 1354	Rui	h 3 116.2	
56	3/14/08 19:45	976.3	976.2	•	Stack B		
57	3/17/08 14:45	915.1	915.0	1/23/2002 0710 - 0809	Rui		
58	3/17/08 15:45	975.2	975.1	1/23/2002 0819 - 1918	Rus		
59	3/17/08 16:45	1042.3	1042.1	1/23/2002 0927 - 1026	. Rus	n 3 146.5	
60	3/17/08 17:45	1037.9	1037.8		Stack C		
61	3/17/08 18:45	1035.4	1035.3	1/22/2002 1320 - 1419	Rus	n 1 224.9	
62	3/17/08 19:45	1045.2	1045.1	1/22/2002 1428 - 1527 -	Rui	n 2 , 222.3	
63	3/17/08 20:45	986.7	960.4	1/22/2002 1534 - 1633	Rui	n 3 233.1	
64	3/18/08 10:45	1009.4	1053.9		Stack D		
65	3/18/08 11:45	1043.1	1043.0	1/22/2002 0900 - 0959	Ruj	n 1 323.2	
66	3/18/08 12:45	1028.2	1023.5	1/22/2002 1017 - 1116	Rui	n 2 330.6	
67	3/18/08 13:45	1054.0	1053.8	1/22/2002 1138 - 1237	Roj	n 3 348.5	
68	3/18/08 14:45	1037.8	1037.7				
69	3/18/08 15:45	1001.1	1000.9	June 2003	Furnace Average	726	
70		1004.9	1004.7		Stack A		
71	3/18/08 17:45	1018.7	1018.5	6/24/2003 0810 - 0910	Rui	n 1 110.2	
72	3/18/08 18:45	913.4	832.0	6/24/2003 1330 - 1430	Rui	n 2 116.7	
73	3/18/08 19:45	909.4	909.3	6/24/2003 1450 - 1550	Rui	n 3 112.1	
74	3/18/08 20:45	950,5	950.4		Stack B	•	
75	3/18/08 21:45	980.2	980,1	6/24/2003 0810 - 0910	Rur	1 137.5	
76	3/18/08 22:45	1007.8	1007.7	6/24/2003 1330 - 1430	Rur		
77	3/18/08 23:45	995.0	994.8	6/24/2003 1450 - 1550	Rur		
78	3/19/08 0:45	985.4	985.3		Slack C		
79	3/19/08 1:45	1010.5	1010.4	6/24/2003 0810 - 0910	Rur	1 189.8	
80	3/19/08 2:45	1051.2	1051.1	6/24/2003 1330 - 1430	Rur	· ·	
B1	3/19/08 3:45	1027.5	1027.3	6/24/2003 1450 - 1550	Rur		
82	3/19/08 4:45	1040.6	1040.5		Stack D		
83	3/19/08 5:45	1006.7	1006.6	6/24/2003 0810 - 0910	Ruz	n 1 294.0	
84	3/19/08 6:45	992.0	991.8	6/24/2003 1330 - 1430	Rur		
5-4	_,, 0.73	552.0			Kai		

85	3/19/08 7:45	1019.0	863.8	6/24/2003 1450 - 1550	•	Run 3	289.6	
86	3/19/08 8:45	998.2	900.7		•			
87	3/19/08 9:45	974.2	942.1	June 2005	Furnace Average	2	756	
88	3/19/08 10:45	980.4	980.2	cine input posts posts	Stack A	Dun 1	113.4	
89 90	3/19/08 11:45	969.8 1026.0	969.7 1025.8	6/28/2005 0810 - 0910 6/28/2005 0935 - 1035		Run 1 Run 2	113.4 104.2	
91	3/19/08 12:45 3/19/08 13:45	1020.9	1020.7	6/28/2008 1045 - 1145		Run 3	106.2	
92	3/19/08 14:45	1014.8	1014.6	0/20/2000 1043 - 1143	Stack B	110112	*00.E	
93	3/19/08 15:45	1000.1	999.9	6/28/2005 1210 - 1310		Run 1	137.7	
94	3/19/08 16:45	981.9	978.7	6/28/2005 1325 - 1425		Run 2	140.2	
95	3/19/08 17:45	982.1	982.0	6/28/2005 1440 - 1540		Run 3	138.8	
96	3/19/08 18:45	990.7	990.6		Stack C			
97	3/19/08 19:45	1001.9	1001.8	6/29/2005 0750 - 0850		Run 1	221.5	
98	3/19/08 20:45	995.1	995.0	6/29/2005 0905 -1005		Run 2	215.8	
99	3/19/08 21:45	952.6	952.4	6/29/2005 1020 - 1120	Stack D	Run 3	207.2	
100	3/19/08 22:45 3/19/08 23:45	933.8 932.2	933.6 898.5	6/29/2005 1140 - 1240	Stack D	Run 1	293.6	
101 102	3/20/08 0:45	932.2 997.8	997.6	6/29/2005 1255 - 1355		Run 2	303.3	
103	3/20/08 1:45	1023.9	1023.8	6/29/2005 1410 - 1510		Run 3	301.1	
104	3/20/08 2:45	1016,2	1016.0	0,20,2000 1110 1220				
105	3/20/08 3:45	987.4	987.2	June 2007	Furnace Averag	e	762	
106	3/20/08 4:45	978.6	978.5		Stack A			
107	3/20/08 5:45	978.6	978.5 ·	6/19/2007 0955 - 1104		Run 1	102.5	
108	3/20/08 6:45	1021.6	1021.5	6/19/2007 1140 - 1253		Run 2	100.1	
109	3/20/08 7:45	1017.0	861.4	6/19/2007 1322 - 1428		Run 3	100.7	
110	3/20/08 8:45	1020.3	921.4		Stack B		457.5	
111	3/20/08 9:45	1028.6	1028.5 995.6	6/19/2007 1504 - 1609		Run 1 Run 2	127.5 131.7	
112 113	3/20/08 10:45 3/20/08 11:45	995.8 976.2	976.0	6/19/2007 1635 - 1739 6/19/2007 1800 - 1904		Run 3	130.8	
114	3/20/08 12:45	1020.3	1020.2	0/13/2007 1000 - 1304	Stack C	110.12	150.0	
115	3/20/08 13:45	1031.6	1007.0	6/20/2007 0610 - 0715	5120.1 5	Run 1	199.9	
116	3/20/08 14:45	980.6	912:9	6/20/2007 0740 - 0845		Run 2	210,4	
117	3/20/08 15:45	936.5	936.4	6/20/2007 0914 - 1014		Run 3	231,4	
118	3/20/08 16:45	933.9	933.8	6/20/2007 1051 - 1154	-	Run 4	201.5	
119	3/20/08 17:45	913.4	871.7		Stack D			
120	3/20/08 18:45	931.0	903.9	6/20/2007 1305 - 1412		Run 1	268,4	
121	3/20/08 19:45	963.8	936.5	6/20/2007 1444 - 1547		Run 2	270.4	
122	3/20/08 20:45	983.9 966.2	983.8 966.1	5/20/2007 1612 - 1717		Run 3	276,9	
123 124	3/20/08 21:45 3/20/08 22:45	978.1	978.0	March/April 2009	Furnace Averag	P	812	
125	3/20/08 23:45	973.7	973.5	Harchy April 2005	Stack A	_	012	
126	3/21/08 0:45	976.0	975.8	3/31/2009 1015		Run 1	139.0	
127	3/21/08 1:45	994,3	994.2	3/31/2009 1249		Run 2	148.0	
128	3/21/08 2:45	1006.7	1006.5	4/1/2009 1248		Run 3	135.2	
129	3/21/08 3:45	969.3	969.2		Stack B			
130	3/21/08 4:45	1011.6	1011.4	4/1/2009 1435		Run 1	150.5	
131	3/21/08 5:45	1005.4	1005,3	4/1/2009 1600		Run 2	152.0	
132	3/21/08 6:45	957.8	957.7	4/1/2009 1704		Run 3	155.5	
133	3/21/08 7:45	1003.9	1003.8 839.8	4 /2 /2000 020	Stack C	Dum 1	235.0	
134 135	3/21/08 8:45 3/21/08 9:45	987.4 1008.3	907.8	4/2/2009 829 4/2/2009 932		Run 1 Run 2	231.6	
136	3/21/08 10:45	991.0	961.3	4/2/2009 1100		Run 3	236.1	
137	3/21/08 11:45	970.3	970.2	v-v	Stack D		** **	
138	3/21/08 12:45	979.2	979.1	4/2/2009 1249		Run 1	283.8	
139	3/21/08 13:45	982.8	982.7	4/2/2009 1425		Run 2	281,0	
140	3/21/08 14:45	945.6	945.5	4/2/2009 1500		Run 3	288.4	
141	3/21/08 15:45	937.5	937.4					
142	3/21/08 16:45	968.5	968.4		Histogra	(1-4)		
143	3/21/08 17:45	1010.9	1010.8			Extrem		
144 145	3/21/08 18:45 3/21/08 19:45	1004.3 972.8	1004.2 972.6	1425.	grand faire a page : recruit	202727271100	Alternative designation of the second	Loc 1002
145	3/21/08 20:45	989.3	989.1				悪寒	52 Seale 11/45 5 53 N 157 5
147	3/21/08 20:45	1006.4	1006.3	. 1651 <b>30</b> 52 Processor				
148	3/21/08 22:45	1010.0	1009.9	7.1				
149	3/21/08 23:45	1003.5	1003.4					strongs til
150	3/22/08 0:45	1000.3	1000.2					
151	3/22/08 1:45	984.3	961.3					Grader galpturitter, f
<b>1</b> 52	3/22/08 2:45	967.7	967.5	35[6]-363				
153	3/22/08 3:45	972.4	972.3			/-		
154	3/22/08 4:45	1002.0	1001.8		E			
155 156	3/22/08 5:45 3/22/08 6:45	989.0 1011.3	988.8 1011.2	1000000	<b>A</b>			
157	3/22/08 6:45	990.7	911.9	0	In a support to the first	0.0	1960 - 1090 112 11	
	2,22,001.72		-11.5		10,7	, 1676 r		

Note: Arcelor determined some data was invalid. The MPCA re-included this data in some calculations, but chose to set the BART limit based on the data determined to be valid by Arcelor.

SF-00006-05 (4/86)

DEPARTMENT: POLLUTION CONTROL AGENCY

STATE OF MINNESOTA
Office Memorandum

DATE: December 2, 2011

TO: AQD File No. 541

(Delta ID No. 13700061)

FROM:

Hongming Jiang

Catherine Neuschler

Air Quality Permits Section Industrial Division

Air Assessment and Environmental Data Management Section

**Environmental Analysis and Outcomes Division** 

PHONE: 4

651-757-2467

651-757-2607

SUBJECT:

Nitrogen Oxides BART Limits for Hibbing Taconite Company (HTC)

This memo was prepared to provide the documentation of the MPCA's  $NO_X$  BART limit determination based on the technical review performed by MPCA staff. EPA's approval of the Regional Haze State Implementation Plan (SIP) for Minnesota is needed for the MPCA's BART determination to become effective.

#### 1. General Information

#### 1.1 Applicant and Stationary Source Location:

Applicant/Mailing Address	Stationary Source (SIC: 1011)/Address
P.O. Box 589	Highway 5 North, Fire Number 4590
Hibbing, MN 55746	Hibbing, MN 55746, St. Louis County
Contact: Ms. Julie Lucas;	Phone: (218) 262-6856

# 1.2 <u>Description of the Facility</u>

Hibbing Taconite Company (HTC) is a taconite (magnetite) ore mining and beneficiation facility located in Hibbing, Minnesota. HTC is owned by ArcelorMittal, Cliffs Natural Resources, and US Steel; Cliffs Natural Resources is the managing agent.

The major steps in taconite pellet production include taconite ore mining, crushing, grinding, concentrating, agglomerating, and indurating. The larger sources of air emissions at HTC are from the mining activities and indurating furnace operations, with lesser amounts from other processing operations and fugitive dust sources, including haul roads and the tailings basin.

The facility was constructed in two phases. Phase I included two Dravo-Lurgi straight grate indurating furnaces. Construction of the phase began in 1974 and operation began in 1976. A third Dravo-Lurgi straight grate indurating furnace was added in Phase II. Construction of Phase II began in 1976, with operation beginning in 1979.

The three pellet indurating furnaces are functionally equivalent. The average production of the three furnaces is roughly equivalent. While the facility is capable of producing 9 million dry long tons annually, it reached its maximum in 1988 when it produced in excess of 8.6 million dry long tons. HTC's pelletizing furnaces are currently controlled by wet scrubbers primarily to remove particulate matter.

HTC started operation in 1976 with the flexibility to use natural gas or fuel oil (all grades). All three furnaces started operation with fuel oil No. 6 (Bunker C) as the primary fuel and were then switched over to natural gas as the primary fuel during 1981. (In the recent past, the facility evaluated other fuels including wood and oat hulls.)

#### 2. Regulatory and/or Statutory Basis

#### 2.1 Overview of Visibility, Regional Haze, and Best Available Retrofit Technology Program

The U.S. EPA's 1999 Regional Haze Rule singles out certain older emission sources that have not been regulated under other provisions of the Clean Air Act for additional controls. The MPCA is required to determine Best Available Retrofit Technology (BART) for these older sources that contribute to visibility impairment in Class I Areas to install Best Available Retrofit Technology (BART). On July 6, 2005, U.S. EPA published a revised final rule, including 40 CFR 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which older sources may need to install BART and for determining BART.

The MPCA is required to determine BART for each source subject to BART based on an analysis of the best system of continuous emission control technology available and associated emission reductions achievable. The analysis must take into consideration the technology available, the costs of compliance, the energy and non-air quality environmental impacts, any pollution control equipment in use at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from use of the technology.

Further discussion of the regulatory basis for this determination can be found in the MPCA's December 2009 Regional Haze State Implementation Plan submittal, in Appendix 9.3.

#### 2.2 Affected Units

The units for which the MPCA must determine BART and establish a NO<sub>X</sub> BART limit consistent with that determination are:

Emission Unit Name	EU Number	Control Equipment and Stack Numbers
Line 1 Pelletizing Furnace	EU020	SV021, SV022,
		SV023, SV024
Line 2 Pelletizing Furnace	EU021	SV025, SV026,
		SV027, SV028
Line 3 Pelletizing Furnace	EU022	SV029, SV030,
_		SV031, SV032

# 2.3 The BART Determination

The MPCA's  $NO_X$  BART determination for this unit, as documented in Appendix 9.3 of the December 2009 Regional Haze SIP submittal, is good combustion practices and implementation of furnace energy efficiency projects in 2005 and 2006. However, due to the lack of sufficient emissions data representing the range of operating conditions that influence emissions, the MPCA did not set an emission limit at the time of making the BART determination.

Instead, the MPCA and HTC entered into an Administrative Order, under which HTC provided additional  $NO_X$  emission information to the MPCA.

#### 2.4 MPCA Determination of the BART Limit

The MPCA reviewed the  $NO_X$  emission information provided by HTC. Extensive stack tests were conducted using Method 7E. Initial stack tests were conducted in 2007 and 2008, and covered the entire range of the plant's operating conditions. Stack tests conducted in 2010 (July, October, November, December) were split to reflect the plant's two main operating conditions: producing standard pellets and producing high compression pellets.

Under the previously mentioned Administrative Order, HTC was required to collect "a minimum of 150 one-hour data points under the range of [furnace] operating parameters that influence  $NO_X$  emissions. The range of each operating parameter during testing should be representative of furnace's operating range for the parameters in the 12 months previous to testing." This requirement was to ensure that the emissions data collected was appropriately representative of the range of operating conditions for the furnace.

The data was collected through simultaneous testing of each of the four furnace stacks at each furnace, and continuously measured data was used to calculate four 15-minute averages for each hour. Then, an hourly average level was calculated for each hour. The process of calculating the BART limit for HTC's indurating furnaces began by constructing a 99% confidence interval and taking the upper predictive level. The MPCA believes the use of a 99% upper predictive level for setting the limit is appropriate, due to the need for limits to be met during all operating conditions, including during times of startup, shutdown, and malfunction.

The example calculation is below:

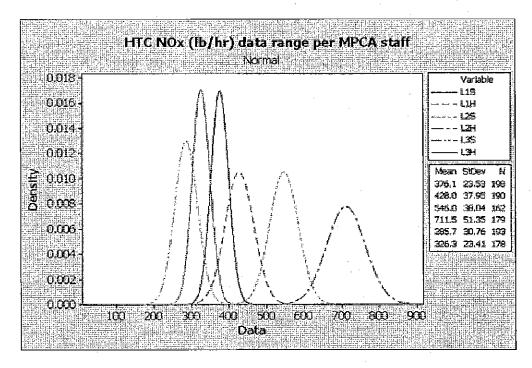
Mean of 30 data points = 
$$\bar{X} + [t - stat \times \sigma \times \sqrt{(\frac{1}{30} + \frac{1}{count})}]$$

- Where X̄ and σ are, respectively, the mean and standard deviation of the sample of hourly-averaged NO<sub>X</sub> data points;
- The t-stat is the 2-tail percentage point of the t-distribution with a level of significance of 0.01 and the appropriate degrees of freedom; and
- $\sqrt{(\frac{1}{30} + \frac{1}{count})}$  is used to relate the sample sizes for the intended compliance test and the sample data set.

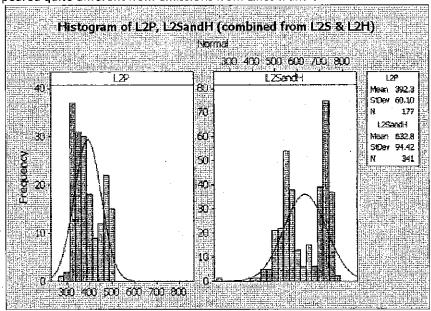
The table below shows the descriptive statistics for the sample data. The MPCA's review focused on the 2010 data. In addition, MPCA staff reviewed the earlier stack test data from 2007 and 2008, and looked at the difference in emissions between the furnaces, as the three furnaces are extremely similar.

	Hibb	ing Taconite NO	x Stack Test Va	ues (in lbs/hour)		
	Line	1	Lin	e 2	Line 3	
	Standard	High Comp	Standard	High Comp	Standard	High Comp
2007/2008 Tests						
# Data Points	16	2	1	77	1	56
Mean	406	.4	39	2.3	31	5.5
St Dev	39.0	00	60.10		39.54	
Max Value	479	.3	51	0.5	36	6.4
Min Value	321	.9	268.2		113.1	
2010 Stack Tests		·				
# Data Points	198	190	162	179	193	178
Mean	376.1	428.0	546.0	711.5	285.7	326.3
St Dev	23.53	37.95	38.0	38.0 51.35		23.41
Max Value	423.2	470.8	630.7	765.2	310.6	355.8
Min Value	275.7	208.0	437.1	249.0	42.2	135.0
99% Interval UPL	388.1	447.4	565.7	737.8	301.4	338.3

A review of the data showed that the data from Line 1 and Line 3 were relatively consistent through the two different tests, and that the data from these furnaces were relatively similar to each other, as shown in the graph below.



However, as shown in the graph below, emissions from Line 2 were very different in the 2010 test from the previous 2007 test, and also appeared quite different from emissions from Lines 1 and 3.



Therefore, the MPCA took a much closer look at the data from Line 2. The combustion chambers on the furnaces at Hibbing Taconite have been modified to add a gas-fired burner at the lower part of the chamber (a vertically placed cylindrical body; two chambers per furnace line). Although the original top burner remains to facilitate oil-firing in case of natural gas curtailment, the MPCA believes that using the lower burner is the main operating scenario. The benefit of

using the lower burner, when firing with natural gas, is a slight fuel saving with an apparent reduction in  $NO_X$  formation and emissions. Based on the data, it appears that the two sets of data from Line 2 may result from different burner management or operation.

Because of the discrepancy in the data, the MPCA believes that CEMS are necessary to monitor emissions on Line 2 in order to most accurately characterize the emissions. However, the MPCA needs to set a BART limit at this time. Because the initial Line 2 data appears to be closer to a standard operating condition for these units, the MPCA chose to set the limit for Line 2 based on the 99% UPL of all data from Line 2 — both the 2007 and 2010 stack test data. Because Line 2 will eventually be using CEMs data for compliance, using the formula to relate the sample sizes for the intended compliance test and the sample data set includes a total of 720 data point for the intended compliance test — 30 days of 24 hourly data points. Also, because the sample size including all the data is large (over 300 data points) a z statistic was used rather than a t-statistic. The resulting equation is:

Mean of 720 data points = 
$$\overline{X} + [z - stat \times \sigma \times \sqrt{(\frac{1}{720} + \frac{1}{count})}]$$

After reviewing stack test data provided by HTC, the MPCA has determined that appropriate BART NO<sub>X</sub> limits are:

Unit	BART NO <sub>x</sub> Limit (lbs/hr)
Line 1 Indurating Furnace	447.4
Line 2 Indurating Furnace	571.7
Line 3 Indurating Furnace	338.3

These limits are a 30-day rolling average.

For Line 1 and Line 3, the MPCA conducted additional analysis in order to help alleviate concerns that any one stack test, even an extended stack test, cannot capture all anticipated furnace operating conditions. This was done through the use of bootstrapping, a resampling technique designed to replicate the taking of multiple samples of the same size from a population.

This technique uses the sample data points as a representative population, from which multiple samples of 30 data points are drawn. A random number generator was used to select the hourly data points used in constructing each 30 data point sample. A total of 2000 sets of 30 hourly data points were generated. The mean of each 30 point data set was then used to make a new, larger, sample of 2000 data points to represent the overall "population" of potential emission levels. This was repeated several times. Each of the surrogate populations thus created had a different standard error. Standard error is the standard deviation of a summary statistic, or a measure of the precision of the estimate. So, in essence, the variability of the standard error for each of these surrogate populations gives a sense of how much the sample mean may differ from the "true" or population mean. The MPCA then looked at this highest standard error, and used that standard error (se) and the mean of the original data point sample to develop an additional 99% UPL. The bootstrap analysis for each line resulted in very similar emission limits, so the MPCA chose to use the classic prediction method.

This limit is for all four stacks from each indurating furnace combined. Compliance is to be determined through  $NO_x$  stack testing, simultaneously measured for 30 hourly data points. Once CEMS are installed on Line 2, those monitors will be used for compliance. CEMS are to be installed and certified within 14 months of the effective date of the Administrative Order implementing the BART limits.

Hibbing Taconite - I Line <b>1</b>	Data for NOx BART I	Limit on Indurating Fu	rnaces	Line 2	
	LA NOVILLA		L1 NOx lb/hr -	No. of the control of	2 NOx lb/hr - All
Timesetama	L1 NOx lb/hr - HC Pellets	Timestamp	Std Pellets	Timestamp	Pellets
Timestamp 7/16/10 9:00	444.0	10/13/10 17:00	423.2	10/24/07 19:34	384.5
7/16/10 10:00	446.1	10/13/10 17:00	418.1	10/25/07 12:10	355.0
7/16/10 10:00	435.7	10/13/10 19:00	414.2	10/25/07 13:10	356.3
7/16/10 11:00	429.7	10/13/10 20:00	418.9	10/25/07 14:10	355.5
7/16/10 13:00	427.1	10/13/10 21:00	404.5	10/25/07 14:47	352.5
7/16/10 14:00	422.4	10/13/10 22:00	415.4	10/25/07 15:47	349.9
7/16/10 16:00	430.7	10/13/10 23:00	416.9	10/25/07 16:47	348.4
7/16/10 17:00	281.4	10/14/10 0:00	403.1	10/25/07 17:47	340.2
7/16/10 18:00	401.3	10/14/10 1:00	414.7	10/25/07 18:47	335.4
7/16/10 19:00	432.2	10/14/10 2:00	416.7	10/25/07 19:47	337.2
7/16/10 20:00	439.6	10/14/10 3:00	408.4	10/25/07:20:47	350.4
7/16/10 21:00	440.6	10/14/10 4:00	415.0	10/25/07.21:47	343.3
7/16/10 22:00	440.2	10/14/10 5:00	409.1	10/25/07 22:47	337.0
7/16/10 23:00	436.0	10/14/10 6:00	409.1	10/25/07 23:47	333.2.
7/17/10 0:00	429. <b>4</b>	10/14/10 7:00	4 <b>1</b> 4.8	10/26/07 0:47	335.3
7/17/10 1:00	441.4	10/14/10 8:00	412.4	10/26/07 1:47	334.0
7/17/10 2:00	434.9	10/14/10 10:00	408.5	10/26/07-2:47	337.6
7/17/10 3:00	436.3	10/14/10 11:00		10/26/07 3:47	329.4
7/17/10 4:00	438.0	10/14/10 12:00	400.1	10/26/07 4:47	339.7
7/17/10 5:00	435.3	10/14/10 13:00		10/26/07 5:47	336.9
7/17/10 6:00	431.4	10/14/10 14:00		10/26/07 6:47	336.9
7/17/10 7:00	432.0	10/14/10 15:00		10/26/07 7:47	347.2
7/17/10 8:00	430.4	10/14/10 16:00	1.	10/26/07 8:47	365.3
7/17/10 9:00	443.2	10/14/10 17:00		10/26/07 9:14	359.7
7/17/10 10:00	434.0	10/14/10 18:00		10/26/07 11:54	350.5
7/17/10 11:00	441.7	10/14/10 19:00	j.	10/26/07 12:54	3519
7/17/10 12:00	444.3	10/14/10 20:00	4	10/26/07 13:54	347.9
7/17/10 13:00	449.8	10/14/10 21:00		10/26/07 14:54	349.4
7/17/10 14:00	437.0	10/14/10 22:00	5	10/26/07 15:54 10/26/07 16:54	349.3 364.3
7/17/10 15:00	424.9 430.6	10/14/10 23:00 10/15/10 0:00		10/26/07 17:54	363.5
7/17/10 16:00	433.0	10/15/10 1:00		10/26/07 18:54	367.7
7/17/10 17:00 7/17/10 18:00	434.5	10/15/10 1:00		10/26/07 19:54	364.6
7/17/10 18:00	431.6	10/15/10 3:00		10/26/07 20:54	371.0
7/17/10 19:00	420.0	10/15/10 4:00	-	10/26/07:21:54	367.0
7/17/10 20:00	430.5	10/15/10 5:00	÷.	10/26/07 22:54	368.0
7/17/10 22:00	431.9	10/15/10 6:00		10/26/07 23:54	367.9
7/17/10 23:00	426.8	10/15/10 7:00		10/27/07 0:54	3713
7/18/10 1:00	418.8	10/15/10 8:00		10/27/07 1:54	3694
7/18/10 2:00	425.6	10/15/10 9:00		10/27/07 2:54	372.5
7/18/10 3:00	418.8	10/15/10 10:00		10/27/07 3:54	376.3
7/18/10 4:00	405.4	10/15/10 11:00	382.2	10/27/07.4:54	384.2
7/18/10 5:00	402.0	10/15/10 12:00	377.4	10/27/07 5:54	378.0
7/18/10 6:00	419.1	10/15/10 14:00	368.8	10/27/07 6:54	378.1
7/18/10 7:00	411.5	10/15/10 15:00	380.8	10/27/07.7:54	462.1
7/18/10 8:00	412.9	10/15/10 16:00		10/27/07 8:54	483.1
7/18/10 9:00	418.9	10/15/10 17:00		10/27/07 11:04	
7/18/10 10:00	419.5	10/15/10 18:00		10/27/07 12:04	485.9
7/18/10 11:00	420.1	10/15/10 19:00		10/27/07 13:04	481.5
7/18/10 12:00	423.5	10/15/10 20:00		10/27/07 14:04	476.3
7/18/10 13:00	424.4	10/15/10 21:00		10/27/07 15:04	478.2
7/18/10 14:00	419.8	10/15/10 22:00		10/27/07 16:04	476.1
7/18/10 15:00	421.9	10/15/10 23:00		10/27/07 17:04	495.5
7/18/10 16:00	360.9	10/16/10 0:00		10/27/07 18:04 10/27/07 19:04	493.9 504.7
7/18/10 18:00	423.8	10/16/10 1:00		10/27/07 19:04	502.6
7/18/10 19:00	420.3 424.6	10/16/10 2:00 10/16/10 3:00		10/27/07 21:04	499.4
7/18/10 20:00 7/18/10 21:00	424.6 245.2	10/16/10 3:00		10/27/07 22:04	503.5
7/18/10 21:00	2 <del>45</del> .2 388.3	10/16/10 4:00	i	10/27/07 23:04	503.7
7/18/10 22:00	427.6	10/16/10 6:00		10/28/07 0:04	506.9
7/19/10 23:00	429.4	10/16/10 8:00	•	10/28/07-0:42	499.8
., 10, 10 0.00	.23.7	15, 15, 15 5.00		on motor and the state of the	The state of the s

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7/19/10 1:00	433.7	10/16/10 9:00	371.7部語	10/28/07 21:27	364.0	
7/19/10 2:00	432.6	10/16/10 10:00	391.9	10/28/07 22:27	357.8	
7/19/10 3:00	432.1	10/16/10 11:00	404.7	10/28/07 23:27	346.2	
7/19/10 4:00	439.4	10/16/10 12:00	399.9	10/29/07 0:27	345.7	
7/19/10 5:00	438.0	10/16/10 13:00	385.7	10/29/07 1:27	339.1	
			380.3	referentation to the first and the contraction of t	이 불어 있는 물건들은 물건으로 이 회사 없는 물건 물건이 되는 사람들이 되었다. 그 회 회사에 이 물	
7/19/10 6:00	437.3	10/16/10 14:00	High ton	10/29/07 2:27	345.9	
7/19/10 7:00	425.3	10/16/10 <b>1</b> 5:00	379.6	10/29/07 3:27	349.2	
7/19/10 8:00	443.8	10/16/10 16:00	387.4	10/29/07.4:27	348.8	
7/19/10 10:00	441.5	10/16/10 17:00	376.4	10/29/07 5:27	343.5	
7/19/10 11:00	437.6	10/16/10 18:00	379.8	10/29/07 6:27	347,7	
7/19/10 12:00	428.9	10/16/10 19:00	383.0	10/29/07 7:59	320.3	
7/19/10 13:00	414.3	10/16/10 20:00	383.6	10/29/07 9:59	333,9	
7/19/10 14:00	425.8	10/16/10 21:00	386.4	10/29/07 10:59	329:1	
7/19/10 15:00	431.1	10/16/10 22:00	373.9	10/29/07 11:59	326.2	ena propertional de Servicios de la Company
			1606000			
7/19/10 16:00	427.6	10/16/10 23:00	313.5	10/29/07 12:59	3311	
7/19/10 17:00	424.3	10/17/10 0:00	372.6	10/29/07 13:59	327,4	
7/19/10 18:00	423.6	10/17/10 1:00	382.1	10/29/07 14:59	327.3	
7/19/10 19:00	419.5	10/17/10 2:00	407.6	10/29/07 15:59	321.6	
7/19/10 20:00	429.4	10/17/10 3:00	410.4	10/29/07 16:59	268.2	
7/19/10 21:00	208.0	10/17/10 4:00	396.5	10/29/07 17:59	337.1	
7/19/10 22:00	272.7	10/17/10 5:00	275.7	10/29/07 18:59	323.1	
7/19/10 23:00	456.4	10/17/10 6:00	359.9	10/29/07 19:59	327.7	
			"HENDEL"	an salam and to the entire of the entire transfer to the territorial for the first transfer to the first transfer transfer to the first transfer transfer transfer transfer to the first transfer transfe	The transfer of the professor of the contract of the contract of	
7/20/10 0:00	451.1	10/17/10 7:00	390.1	10/29/07 20:59	325.8	
7/20/10 1.00	456.0	10/17/10 8:00	389.0	10/29/07 21:59	332.3	
7/20/10 2:00	456.4	10/17/10 9:00	383.1	10/29/07 22:59	333,1	
7/20/10 3:00	465.2	10/17/10 10:00	393.1	10/29/07 23:59	327.8	
7/20/10 4:00	460.7	10/17/10 11:00	391.1	10/30/07 0:59	330.4	
7/20/10 5:00	455. <b>1</b>	10/17/10 12:00	390.6	10/30/07 1:59	335,1	
7/20/10 6:00	454.2	10/17/10 13:00	391.7	10/30/07 2:59	327.5	
7/20/10 7:00	456.0	10/17/10 14:00	387.9	10/30/07 3:59	318.0	
7/20/10 7:00	246.6	10/17/10 15:00	389.2	10/30/07 4:59	310.5	
			63,63036	والمراج والمراجع	ուրավոր հարցին առաջին և տասարանության այն արդանական հետոնն «Արդեկ ըստ հրատարագատության իր որանկարական հարցական	
7/20/10 10:00	411.9	10/17/10 17:00	396.2	10/30/07 5:29	304.3	
7/20/10 11:00	441.3	10/17/10 18:00	389.6	10/30/07 10:40	452.0	
7/20/10 12:00	445.2	10/17/10 19:00	387.4	10/30/07 11:40	437,1	
7/20/10 13:00	380.2	10/17/10 20:00	387.4	10/30/07 12:40	432.7	
7/20/10 14:00	444.7	10/17/10 21:00	388.5	10/30/07 13:40	419.0	
7/20/10 15:00	450,2	10/17/10 22:00	386.1	10/30/07 14:40	424.1	
7/20/10 16:00	449.9	10/17/10 23:00	378.5	10/30/07 15:40	382,5	
7/20/10 17:00	445.4	10/18/10 0:00	375.6	10/30/07 16:40	390.4	
7/20/10 17:00	442.4	10/18/10 1:00	383.6	10/30/07:17:40	380.1	
			4100400	product day and advantage product the state of the state	r participate to the search of the search of the search of the search of	
7/20/10 19:00	447.6	10/18/10 2:00	384.0	10/30/07 18:40	386.7	
7/20/10 20:00	446.6	10/18/10 3:00	387.8	10/30/07 19:40	388.1	
7/20/10 21:00	445.9	10/18/10 4:00	382.8	10/30/07 20:40	391.1	
7/20/10 22:00	443.4	10/18/10 5:00	383.0	10/30/07 21:40	393.3	
7/20/10 23:00	448.4	10/18/10 6:00	381.5	10/30/07 22:40	392.2	
7/21/10 0:00	449.7	10/18/10 7:00	381.2	10/30/07 23:40	370.8	
7/21/10 1:00	445.3	10/18/10 8:00	383.2	10/31/07:0:40	376.6	
7/21/10 2:00	442.2	10/18/10 9:00	383.4	10/31/07 7:49	400.4	
7/21/10 3:00	449.1	10/18/10 11:00	385.6	10/31/07 9:30	398.7	
7/21/10 3:00	447.5	10/18/10 12:00	387.5	hat berkati hat tilbarrak kantilitik takin takin biri	411.5	
				10/31/07 11:30		
7/21/10 5:00	454.7	10/18/10 13:00	386.2	10/31/07 12:30	400.2	
7/21/10 6:00	451.4	10/18/10 14:00	380.9	10/31/07 13:30	398.5	
7/21/10 7:00	451.3	10/18/10 15:00	370.0	10/31/07 14:30	409.9	
7/21/10 8:00	446.1	10/18/10 16:00	364.6	10/31/07 14:45	401.1	
7/21/10 9:00	449.8	10/18/10 <b>1</b> 7:00	371.0	10/31/07 15:45	401.1	
7/21/10 10:00	447.7	10/18/10 18:00	366.3	10/31/07 16:35	406.3	
7/21/10 11:00	455.8	10/18/10 19:00	360.5	10/31/07 20:11	442.8	
7/21/10 12:00	467.1	10/18/10 20:00	364.9	10/31/07 21:11	467.6	
7/21/10 12:00	462.0	10/18/10 20:00	360.9	10/31/07 22:11	472.7	opistick (1914) Triggeria
		- , -	5696695		ancientariani en la la la la completa de la comp	
7/21/10 14:00	456.3	10/18/10 22:00	368.5	10/31/07 23:11	493.4	
7/21/10 15:00	457.3	10/18/10 23:00	360.1	11/1/07 0:11	488.4	
7/21/10 16:00	464.4	10/19/10 0:00	346.4	11/1/07 1:11	486.7	langenegeter
7/21/10 17:00	461.1	10/19/10 1:00	344.7	11/1/07 2:11	482.6	
7/21/10 18:00	467.7	10/19/10 2:00	334.8	11/1/07 3:11	491.3	
7/21/10 19:00	470.8	10/19/10 3:00	330.5	11/1/07 4:11	489.9	
7/21/10 20:00	467.5	10/19/10 4:00	334.3	11/1/07.5:11	490.9	
,		,,	span	न्तर । व्यवस्थान व्यवस्थान स्थानिक । स्थ	4 Andreas - The general state of the sta	r la interpretation de programatie

			sanaane		TOURS OF MANAGES AND PROPERTY OF STREET	topic trailes
7/21/10 21:00	467.1	10/19/ <b>1</b> 0 5:00	331.9	11/1/07 6:11	481.9	
7/21/10 22:00	460.5	10/19/10 6:00	323.4	11/1/07.6:30	510:5	
7/21/10 23:00	463.8	10/19/10 7:00	325.9	11/1/07.7:30	411.5	
7/22/10 0:00	463.9	10/19/10 8:00	326.9	11/1/07 8:30	365.6	
7/22/10 1:00	464.2	10/19/ <b>1</b> 0 9:00	320.1	11/1/07 10:14	370.3	
7/22/10 2:00	458.9	10/19/10 10:00	285.0	11/1/07 11:14	360.4	The second secon
7/22/10 3:00	458.9	10/19/10 13:00	320.1	11/1/07 12:14	364.4	
7/22/10 4:00	460.1	10/19/10 14:00	348.2	11/1/07 13:14	354.9:	
7/22/10 5:00	450.7	10/19/10 15:00	345.1	11/1/07 14:14	357.8	
7/22/10 6:00	446.0	10/19/10 16:00	351.0	11/1/07 15:14	364.5	- Maria Maria Maria
7/22/10 7:00	455.1	10/19/10 17:00	354.9	11/1/07 16:14	359.0:	
7/22/10 8:00	456.7	10/19/10 18:00	355.4	11/1/07 17:14	362.8	
7/22/10 9:00	450.3	10/19/10 19:00	359.7	11/1/07 18:14	364.5	
7/22/10 10:00	447.1	10/19/10 20:00	361.0	11/1/07 19:14	381.7	
7/22/10 11:00	445.3	10/19/10 21:00	353.4	11/1/07 20:14	406.0	
7/22/10 12:00	448.0	10/19/10 22:00	368.1	11/1/07 21:14	434.4	
7/22/10 13:00	446.2	10/19/10 23:00	359.8	11/1/07 22:14	444.7	
7/22/10 14:00	446.5	10/20/10 0:00	357.3	11/1/07 23:14	436.8	
7/22/10 15:00	444.0	10/20/10 1:00	361.4	11/2/07 0:14	441.6	
7/22/10 16:00	444.1	10/20/10 2:00	360.6	11/2/07 1:14	446.1	
7/22/10 17:00	443.6	10/20/10 3:00	359.3	11/2/07 2:14	412.5	
7/22/10 18:00	449.5	10/20/10 4:00	352.5	11/2/07:3;14	407.2	
7/22/10 19:00	446.6	10/20/10 5:00	349.3	11/2/07 4:14	441.3	
7/22/10 20:00	435.2	10/20/10 6:00	350.6	11/2/07-5.14	430.8	
7/22/10 21:00	373.0	10/20/10 7:00	353.2	11/2/07.6:14	433.2	
7/22/10 22:00	439.6	10/20/10 8:00	365.3	11/2/07 7 14	413.0	
7/22/10 23:00	436.1	10/20/10 10:00	375.6	11/2/07 7:29	314.3	
7/23/10 0:00	431.5	10/20/10 11:00	376.5	11/2/07:8:00	318.5	Charles (make) Table (make) Called (make) Table (make) Called (make) Table (make) Called (make) Table (make)
7/23/10 1:00	432.6	10/20/10 12:00	378.1	11/2/07.9:35	319.2	
7/23/10 2:00	440.4	10/20/10 13:00	382.3	11/2/07 10:35	314.6	
7/23/10 3:00	439.4	10/20/10 14:00	364.3	11/2/07 11:35	320.7	
7/23/10 4:00	424.4	10/20/10 15:00	366.3	11/2/07 12:35	320.0	
7/23/10 5:00	235.8	10/20/10 16:00	373.9	11/2/07 13:35	328.3	
7/23/10 6:00	422.5	10/20/10 17:00	376.0	11/2/07 14:35	322.9	
7/23/10 7:00	440.6	10/20/10 18:00	377.9	11/2/07/14:59		Hallor Halley
7/23/10 8:00	438.4	10/20/10 19:00	373.6	11/2/07 15:59	458.6	
7/23/10 9:00	435.0	10/20/10 20:00	381.5	11/2/07 16:29	476.4	
7/23/10 10:00	422.3	10/20/10 21:00	370.2	11/2/07 17:29	464.1	
7/23/10 11:00	410.5	10/20/10 22:00	364.9	11/2/07 18:29	477.6	
7/23/10 12:00	418.3	10/20/10 23:00	368.2	11/2/07 19:29	474.3	
7/23/10 13:00	417.8	10/21/10 0:00	367.5	11/2/07 20:29	462.0	
7/23/10 14:00	414.2	10/21/10 1:00	365.0	11/2/07 21:29	472.0	Transport
7/23/10 15:00	407.7	10/21/10 2:00	368.3	11/2/07 22:29	472.0	
7/23/10 16:00	392.3	10/21/10 3:00	361.4	11/2/07 23:29	454.0	1250 (19. 19.44) 1600 (18. 19.44)
7/23/10 17:00	400.5	10/21/10 4:00	382.9	11/3/07 0:29	469,9	
7/23/10 18:00	408.0	10/21/10 5:00	388.2	11/3/07 1:29	473.1	
7/23/10 19:00	407.3	10/21/10 6:00	388.8	11/3/07 2:29	465.3	
7/23/10 20:00	421.2	10/21/10 7:00	384.7	11/3/07:3:29	468.0	
7/23/10 21:00	413.0	10/21/10 8:00	385.4	11/3/07 4:29	458.0	
7/23/10 22:00	416.6	10/21/10 9:00	376.9	11/3/07 5:29	473.5	
7/23/10 23:00	412.5	10/21/10 10:00	369.8	The state of the s	The second secon	
7/24/10 0:00	411.1	10/21/10 12:00	359.6	paragram (a. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	The common way when you be a selected for the common way to be a s	
7/24/10 1:00	403.0	10/21/10 13:00	359.3			
7/24/10 2:00	406.5	10/21/10 14:00	366.2	The second secon	The second secon	
7/24/10 3:00	410.8	10/21/10 15:00	362.4		manipulation (m. 1900 to 1100 to 1200	
7/24/10 4:00	410.5	10/21/10 16:00	362.6	The second secon		
7/24/10 5:00	404.0	10/21/10 17:00	370.0			
7/24/10 6:00	409.3	10/21/10 18:00	368.5			
7/24/10 7:00	402.1	10/21/10 19:00	364.6	Addition of the second		
7/24/10 8:00	397.7	10/21/10 20:00	365.3			
7/24/10 9:00	402.1	10/21/10 21:00	364.5		nagana and an	
7/24/10 10:00	409.9	10/21/10 22:00	358.3			
7/24/10 11:00	408.3	10/21/10 23:00	362.3			
		10/22/10 0:00	351.7			
		10/22/10 1:00	357.6			
		10/22/10 2:00	346.9		Program in the Control of the Contro	

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**	10/22/10 2-00	254 C RESERVICIO A CALCADA EN ANTICO DE LA CALCADA EN ANTICO DE CALCADA	
•	10/22/10 3:00	351.6	
	10/22/10 4:00	347.6	
	10/22/10 5:00	349.8	
•	10/22/10 6:00	352.7	
	10/22/10 7:00	351.7	
Count 190	Count 198	Count 177	
Average 428.02	Average 376.10	Average 392.32	
St Dev 37.95	St Dev 23.53	StDev. 60:10	
Max 470.84	Max 423.20	Max 510:49	
Min 207.96	Min 275.72	Min 268.19	
t <sub>0.05, r-1</sub> 1.973	t <sub>0.05, c-1</sub> 1.972	t <sub>0.05, c1</sub> 1.974	
UPL 95% 442.73	UPL 95% 385.19	UPL 95% 415.74	
UCL 95% 433.45	UCL 95% 379.40	UCL 95% 401 24	
t <sub>0.01, c-1</sub> 2.602	t <sub>0.01, c-1</sub> 2.601	<b>t</b> on c 1 2 604	
UPL 99% 447.42	<b>UPL 99%</b> 388.09	UPL 99% 423.22	
UCL 99% 435.18	UCL 99% 380.45	UCL 99% 404 09	

	and the second s		The late the second sec	ine s	•		
	Line 2 NOx lb/hr	the control of the co	L2 NOx lb/hr -	L	3 NOx ĺb/hr - H	3	L3 NOx lb/hr -
Timestamp	Std Pellets	Timestamp	HC Pellets	Timestamp	Pellets	Timestamp	Std Pellets
10/22/10 17:00	607.7	11/6/10 15:00	741.8	11/16/10 13:00	324.1	11/27/10 13:00	294.01
10/22/10 18:00	610.0	11/6/10 16:00	755.8	11/16/10 14:00	318.3	11/27/10 14:00	295.70
10/22/10 19:00	586.3	11/6/10 17:00	763.4	<b>11/16/10 15:00</b>	318.2	11/27/10 <b>1</b> 5:00	301.17
10/22/10 20:00	618.8	11/6/10 18:00	760.1	11/16/10 16:00	316.6	11/27/10 16:00	300.94
10/22/10 21:00		11/6/10 19:00	765.2	11/16/10 17:00	319.0	11/27/10 17:00	301.50
10/22/10 22:00	601.8	11/6/10 20:00	760.5	11/16/10 18:00	320.1	11/27/10 18:00	302.76
10/22/10 23:00	eng tengeneral and the bound of the second	11/6/10 21:00	745.4	11/16/10 19:00	317.5	11/27/10 19:00	299.37
10/23/10 0:00	and the second of the second o	11/6/10 22:00	746.3	11/16/10 20:00	315.4	11/27/10 20:00	298.86
10/23/10 1:00	594.2	11/6/10 23:00	759.8	11/16/10 21:00	317.8 326.7	11/27/10 21:00 11/27/10 22:00	. 298.83 297.09
10/23/10 2:00	589,4 590.2	11/7/10 0:00 11/7/10 1:00	738.3 741.3	11/16/10 22:00 11/16/10 23:00	327.7	11/27/10 22:00	298.86
10/23/10 3:00 10/23/10 4:00	The state of the s	11/7/10 1:00	745.2	11/17/10 0:00	332.5	11/28/10 0:00	297.00
10/23/104:00	and the second of the second o	11/7/10 3:00	756.0	11/17/10 1:00	332.9	11/28/10 1:00	294.28
10/23/10 12:00	Control of the second second second second	11/7/10 4:00	751.1	11/17/10 2:00	333.8	11/28/10 2:00	293.72
10/23/10 13:00	of the commence of the second second second second	11/7/10 5:00	746.3	11/17/10 3:00	332.2	11/28/10 3:00	294.03
10/23/10 14:00	· · · · · · · · · · · · · · · · · · ·	11/7/10 6:00	750.4	11/17/10 4:00	335.3	11/28/10 4:00	294.99
10/23/10 15:00	Contract the first days are been been been	11/7/10 7:00	756.4	11/17/10 5:00	336.4	11/28/10 5:00	291.93
10/23/10 16:00	and present the element of the first and the state of the first terms.	11/7/10 8:00	749.9	11/17/10 6:00	333.8	11/28/10 6:00	294.31
10/23/10 17:00	571.0	11/7/10 9:00	755.0	11/17/10 7:00	336.2	11/28/10 7:00	293.42
10/23/10 18:00	553.6	11/7/10 10:00	753.1	11/17/10 8:00	333,2	11/28/10 8:00	293.49
10/23/10 19:00	the first of the property of the state of th	11/7/10 11:00	740.4	11/17/10 9:00	341.8	11/28/10 9:00	291.37
10/23/10 20:00	man teatrate as the sendent transfer and the sendent to the senden	11/7/10 12:00	737.1	11/17/10 10:00	336.0	11/28/10 10:00	290.46
10/23/10 21:00	and the street of the street o	11/7/10 13:00	740.2	11/17/10 11:00	336.0	11/28/10 11:00	289.10
10/23/10 22:00	to the first of our opening and and before the time	11/7/10 14:00	744.7	11/17/10 12:00	336.6	11/28/10 12:00	290.27
10/23/10 23:00	management of the state of the	11/7/10:15:00	748.2	11/17/10 13:00	322.8	11/28/10 14:00	284.77 277.78
10/24/10.0:00		11/7/10 16:00	740.1 744.2	11/17/10 14:00 11/17/10 15:00	306.8 324.1	11/28/10 15:00 11/28/10 16:00	292.63
10/24/10 1:00 10/24/10 2:00	- to standard and a series property and the grant bearing to the	11/7/10 17:00 11/7/10 18:00	744.2 748.4	11/17/10 15:00	324.1 328.6	11/28/10 10:00	294.24
10/24/10 2:00	그리 수 그림 그 나는 사람들이 하고 있는데 그 맛있다면 그는 그 생각 모든 그 생각이 없었다.	11/7/10 19:00	741.0	11/17/10 10:00	297.1	11/28/10 18:00	294.31
10/24/10 3:00	egy to the transfer of the manner with a decision with an	11/7/10 20:00	732.0	11/17/10 17:00	309.7	11/28/10 19:00	294.50
10/24/10 5:00	management as as is a second of the control of the	11/7/10 21:00	728.7	11/17/10 19:00	325.7	11/28/10 20:00	292.53
10/24/10 6:00		11/7/10 22:00	732.1	11/17/10 20:00	329.2	11/28/10 21:00	290.94
10/24/10 7:00	grant grant and an arranged and an arranged from the	11/7/10 23:00	737.1	11/17/10 21:00	328.4	11/28/10 22:00	286.85
10/24/10 8:00	569.4	11/8/10 0:00	722.3	11/17/10 22:00	330.0	11/28/10 23:00	289.04
10/24/10 9:00	558.1	11/8/10 1:00	737.4	11/17/10 23:00	331.5	11/29/10 0:00	287.60
10/24/10 10:00		11/8/10 2:00	728.2	11/18/10 0:00	327.9	11/29/10 1:00	287.98
10/24/10 11:00		11/8/10 3:00	727,5	11/18/10 1:00	327.7	11/29/10 2:00	289.12
10/24/10 12:00	en endertrakan an indicialitati 1747 titat	11/8/10 4:00	729,5	11/18/10 2:00	327.4	11/29/10 3:00	290.45
10/24/10 13:00	and the second s	11/8/10 5:00	733.5	11/18/10 3:00	328.3 331.6	11/29/10 4:00 11/29/10 5:00	290.20 290.79
10/24/10 15:00	for complete devices up the beautique by high hard and an	11/8/10 6:00	729.5 726.8	11/18/10 4:00 11/18/10 5:00	331.0	11/29/10 5:00	292.44
10/24/10 16:00 10/24/10 17:00	despute the bear on the server of the server	11/8/10.7:00 11/8/10.8:00	733.0	11/18/10 5:00	330.9	11/29/10 7:00	293.19
10/24/10 17:00		11/8/10 9:00	738.8	11/18/10 7:00	328.9	11/29/10 8:00	293.17
10/24/10 19:00	or former and market property the angeles of the contract of	11/8/10 11:00	726.8	11/18/10 8:00	330.6	11/29/10 9:00	
10/24/10 20:00		11/8/10 12:00	675.8	11/18/10 9:00	331.6	11/29/10 10:00	293.10
10/24/10 21:00	Control of the second s	11/8/10 13:00	644.6	11/18/10 10:00	331.6	11/29/10 11:00	291.23
10/24/10 22:00	the section of the contraction of the contraction	11/8/10:14:00	651.9	11/18/10 11:00	334.6	11/29/10 12:00	288.11
10/24/10 23:00	.555.8	11/8/10 15:00	654.8	11/18/10 12:00	333.5	<b>1</b> 1/29/10 13:00	
10/25/10.0:00	561.9	11/8/10 16:00	657,6	11/18/10 13:00	335.8	11/29/10 14:00	
10/25/10 1:00	patent and an experience of the second secon	11/8/10 17:00	663.5	11/18/10 14:00	327.0	11/29/10 15:00	
10/25/10 2:00	CONTROL OF THE PROPERTY OF THE PROPERTY OF THE PROPERTY OF THE	11/8/10 18:00	687,4	11/18/10 15:00		11/29/10 16:00	
10/25/10 3:00		11/8/10 19:00	683.2	11/18/10 16:00	327.3	11/29/10 17:00	
10/25/10 4:00		11/8/10 20:00	711.0	11/18/10 17:00 11/18/10 18:00	326.9 327.3	11/29/10 18:00 11/29/10 19:00	
10/25/10 5:00	ing a light of the control of the state of the control of the cont	11/8/10 21:00 11/8/10 22:00	710.5 720.2	11/18/10 18:00	327.5 319.6	11/29/10 19:00	
10/25/10 6:00	the state of the s	11/8/10 22:00	720.2 728.3		316.8	11/29/10 20:00	
10/25/10 7:00 10/25/10 8:00	min mer men girmen er migen gemein ein bei bei ber	11/8/10/23:00	726.3 658.6	11/19/10 11:00	321.2	11/30/10 10:00	
10/25/10 8.00	and the first of the control of the	11/9/10 1:00	659.2	11/19/10 14:00	327.8	11/30/10 11:00	
10/25/10 18:00	and the state of t	11/9/10 2:00	650.6			11/30/10 12:00	
10/25/10 19:00	the description property and and how of the call	11/9/10 3:00	653.0	• •	331.5	11/30/10 13:00	
10/25/10 20:00	and the late of the first of the first of the first of the		653.0		334.3	11/30/10 14:00	
ALLEGE BELLEVILLE TO THE SECOND STATE			and the second second second second second				

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10/25/10 21:00	551.0 11/9/10 5:00	648.6	11/19/10 18:00	333.3	11/30/10 15:00	264.81
10/25/10 22:00	552.1 11/9/10 6:00	655.7	11/19/10 19:00	329.3	11/30/10 16:00	267.36
10/25/10 23:00	551.3 11/9/10 7:00	649.0	11/19/10 20:00	328.1	11/30/10 17:00	274.66
10/26/10 0:00	542.7 11/9/10 8:00	660.1	11/19/10 21:00	328.4	11/30/10 18:00	280.10
10/26/10 1:00	542.0 11/9/10 9:00	662.3	11/19/10 22:00	328.9	11/30/10 19:00	283.13
10/26/10 2:00	530.0 11/9/10 11:00	724.5	11/19/10 23:00	333.9	11/30/10 20:00	284.76
10/26/10 3:00	528.8 11/9/10 12:00	721.7	11/20/10 0:00	333.4	11/30/10 21:00	287.89
10/26/10 4:00	524.3 11/9/1013.00	719.1	11/20/10 0:00	329.8	11/30/10 22:00	287.80
		Mary Ingastra Literature				
10/26/10 12:00	11/9/10 14:00 iiii	708.0	11/20/10 2:00	333.2	11/30/10 23:00	286.04
10/26/10 13:00	512.6 11/9/10 15:00	715,4	11/20/10 3:00	326.7	12/1/10 0:00	284.30
10/26/10 14:00	558.1 11/9/10 16:00 mi	709.1	11/20/10 4:00	330.6	12/1/10 1.00	284.50
10/26/10 15:00	573.7 11/9/10 17:00	709.8	11/20/10 5:00	331.1	12/1/10 2:00	288.79
10/26/10 16:00	Fig. 563.7 11/9/10 18:00	707.6	11/20/10 6:00	336.0	12/1/10 3:00	294.38
10/26/10 17:00	564.4 11/9/10 19:00	636.1	11/20/10 7:00	335.1	12/1/10 4:00	294.33
10/26/10 18:00	549,4 11/9/10 20:00	617.6	11/20/10 8:00	333.6	12/1/10 5:00	295.61
10/26/10 19:00	559.3 11/9/10 21:00	714.1	11/20/10 9:00	340.3	12/1/10 6:00	295.98
10/26/10 20:00	570.5 : 11/9/10 22:00	713.3	11/20/10 10:00	342.6	12/1/10 7:00	295.42
10/26/10 21:00	555.1 11/9/10 23:00	709.9	11/20/10 11:00	342.2	12/1/10 8:00	295.07
10/26/10 22:00	547.7 11/10/10.0:00	716.0	11/20/10 12:00	342.2	12/1/10 9:00	297.87
10/26/10 23:00	562.6 11/10/10 1:00	723.0	11/20/10 13:00	349.6	12/1/10 10:00	297.95
10/27/10 0:00	567.8 11/10/10 2:00	714.9	11/20/10 14:00	350.8	12/1/10 11:00	300.92
10/27/10 1:00	565:3 11/10/10:3:00	725.0	11/20/10 15:00	332.9	12/1/10 12:00	296.96
10/27/10 2:00	573.0 11/10/10 4:00	726.5	11/20/10 16:00	321.0	12/1/10 13:00	298.10
10/27/10 3:00		international conduction				296.08
10/27/10 3 00	trajang i dagang bang at bang tali kada dalah dagan pangan dagan dalah dagan bermula bermula dagan dagan dagan Dagan bang dagan bang dagan dagan bang bang dagan dagan dagan dagan bermula bermula dagan bermula dagan dagan	728.1	11/20/10 17:00 11/20/10 18:00	351.1	12/1/10 14:00 12/1/10 15:00	
manded and the production bearing and the good for the product of the contract	Company of the contract of the first of the contract of the co	724.8	. ,	346.3	, ,	294.52
10/27/10 5:00:	573.1 11/10/10 7:00	724,3	11/20/10 19:00	349.4	12/1/10 16:00	294.70
10/27/10 6:00	564.8 11/10/10 8:00	(-  <b>/,21,5</b>	11/20/10 20:00	348.9	12/1/10 17:00	296.88
10/27/10 7:00	562.8 11/10/10.9:00	719.8	11/20/10 21:00	346.3	12/1/10 18:00	300.85
10/27/10 8:00	11/10/10 10:00	704.2	11/20/10 22:00	348.7	12/1/10 19:00	299.29
10/27/10 9:00	559.2 11/10/10 11:00	694.8	11/20/10 23:00	349.0	12/1/10 20:00	299.19
10/27/10 10:00	561.2 11/10/10 12:00	692,4	11/21/10 0:00	349.1	12/1/10 21:00	300.24
10/27/10:11:00	562,5 11/10/10 13:00	695.5	11/21/10 1:00	348.5	12/1/10 22:00	298.89
10/27/10 12:00	545.7 : 11/10/10 14:00	692.5	11/21/10 2:00	349.9	12/1/10 23:00	301.31
10/27/10 13:00	540.4 11/10/10.15:00	692.0	11/21/10 3:00	354.4	12/2/10 0:00	301.31
10/27/10 14:00	543.7 11/10/10 16:00	707.1	11/21/10 4:00	355.8	12/2/10 1:00	299.72
10/27/10 15:00	538.5 11/10/10 17:00	7173	11/21/10 5:00	352.5	12/2/10 2:00	297.82
10/27/10 16:00	529.4 11/10/10 18:00	722.6	11/21/10 6:00	350.8	12/2/10 3:00	295.79
10/27/10 17:00	526.6 11/10/10 19:00	705.5	11/21/10 7:00	348.6	12/2/10 4:00	299.70
10/27/10 18:00	537.0 11/10/10 20:00	707.6	11/21/10 8:00	350.4	12/2/10 5:00	267.51
10/27/10 19:00	531:5 11/10/10 21:00	716.6	11/21/10 9:00	353.4	12/2/10 6:00	226.65
10/27/10 20:00	531.7 11/10/10 22:00	714.1	11/21/10 10:00	351.2	12/2/10 7:00	196.94
10/27/10 21:00	521.3 11/10/10 23:00	713.3	11/21/10 11:00	347.4	12/2/10 7:00	131.39
10/27/10 22:00	520.6 11/11/10 0:00	713.2	11/21/10 11:00	347.4	12/2/10 8:00	273.71
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10/27/10/25:00	· [마마리트] [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [ [	711,4 705.9	11/21/10 13:00 11/21/10 15:00	348.7	12/2/10 10:00	281.69
light places that are not recognized by a company many transfer extra giges		ear tracked of the period		342.9	12/2/10 11:00	42.20
10/28/10 1:00	513 8 11/11/10 3:00	711.6	11/21/10 16:00	340.2	12/2/10 12:00	207.76
10/28/10 2:00		720.1	11/21/10 17:00	334.7	12/2/10 13:00	275.18
10/28/10 3:00	509.9 11/11/10 5:00	726.8	11/21/10 18:00	337.0	12/2/10 14:00	288.46
10/28/10 4:00	504.8 0 11/11/10 6:00	739,4	11/21/10 19:00	333.9	12/2/10 15:00	287.37
10/28/10 5:00	515.4 11/11/10 7:00	740.5	11/21/10 20:00	331.2	12/2/10 16:00	283.87
10/28/10 6:00	510.5 11/11/10 8:00	749.8	11/22/10 15:00	135.0	12/2/10 17:00	283.11
10/28/10 7:00	497,1 11/11/10 9:00	745.3	11/22/10 16:00	257.9	12/2/10 18:00	281.75
10/28/10 8:00	496.4 11/11/10 10:00	753.0	11/22/10 17:00	262.0	12/2/10 19:00	284.70
10/28/10 9:00	494.4 11/11/10 11:00	743.5	11/22/10 18:00	279.5	12/2/10 20:00	286.48
10/28/10 10:00	511.1 11/11/10 12:00	681.0	11/22/10 19:00	274.9	12/2/10 21:00	288.06
10/28/10 11:00	515.0 11/11/10 13:00	733.3	11/22/10 20:00	286.2	12/2/10 22:00	288.30
10/28/10 12:00	526.3 11/11/10 14:00	723.9	11/22/10 21:00	284.0	12/2/10 23:00	287.67
10/28/10 13:00	515.4 11/11/10 15:00	724.3	11/22/10 22:00	284.5	12/3/10 0:00	288.41
10/28/10 14:00	522.9 11/11/10 16:00	717.8	11/22/10 23:00	285.1	12/3/10 1:00	289.28
10/28/10 15:00	516.0 11/11/10 17:00	660.5	11/23/10 0:00	287.6	12/3/10 2:00	288.28
10/28/10 16:00	509.8 11/11/10 18:00	724,3	11/23/10 1:00	283.9	12/3/10 3:00	290.14
10/28/10 17:00	509.0 11/11/10 19:00	724.1	11/23/10 1:00	283.9	12/3/10 3:00	288.62
10/28/10 17:00	497.0 11/11/10 20:00	720.2	11/23/10 2:00	288.8	12/3/10 4:00	292.51
rempresentation of the supplemental transfer to the profit rempresentation of the second seco		treate land tendare:				
10/28/10 19:00	488.3 11/11/10 21 00	710.1	11/23/10 4:00	288.0	12/3/10 6:00	291.40
10/28/10 20:00	498.9 11/11/10 22:00	718.2	11/23/10 5:00	291.0	12/3/10 7:00	292.85
10/28/10 21:00	489.8 11/11/10/23:00	714.6	11/23/10 6:00	289.2	12/3/10 8:00	292.49

10/28/10 22:00	489.9 11/12/10 0:00	717.1	11/23/10 7:00	287.4	12/3/10 9:00	288.90
10/28/10 23:00	496.3 11/12/10 12:00	748.1	11/23/10 8:00	265.8	12/3/10 10:00	284.46
10/29/10 0:00	492.5 11/12/10 13:00	749.3	11/23/10 9:00	285.1	12/3/10 11:00	286.67
		the problem of the first problem.				289.03
10/29/10 1:00	479.1 11/12/10 14:00	740.6	11/23/10 10:00	293.0	12/3/10 12:00	
10/29/10 2:00	476.1 11/12/10 15:00	612.3	11/23/10 11:00	322.2	12/3/10 13:00	292.24
10/29/10 3:00	472.3 11/12/10 16:00	249.0	11/23/10 12:00	319.6	12/3/10 14:00	292.57
10/29/10 4:00	475.6 11/12/10 17:00	390.3	11/23/10 13:00	325.9	12/3/10 15:00	295.21
war a considerate and the second seco	product and the second	de la transferancia de la companya de la fina				
10/29/10 5:00	476.6 11/12/10 18:00	676.1	11/23/10 14:00	325.1	12/3/10 16:00	297.02
10/29/10 6:00	452.3 11/12/10 19:00	729.2	11/23/10 15:00	327.6	12/3/10 17:00	299.08
10/29/10 7:00	496.1 11/12/10 20:00	717.0	11/23/10 16:00	331.7	12/3/10 18:00	295.49
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Children College College College and and and and better the		The state of the s	, ,		12/3/10 20:00	285.47
10/29/10 9:00	572.2 11/12/10.22:00	717.7	11/23/10 18:00	327.6	, ,	
10/29/10 10:00	604,4 11/12/10 23:00	723.4	11/23/10 19:00	327.9	12/3/10 21:00	293.06
10/29/10 12:00	607.4 11/13/10 0:00	728.6	11/23/10 20:00	326.7	12/3/10 22:00	293.72
10/29/10 13:00	630.7 11/13/10 1:00	729.1	11/23/10 21:00	333.0	12/3/10 23:00	291.79
		725.0	11/23/10 22:00	332.7	12/4/10 0:00	297.06
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	11/14/10 11:00	704.7	11/25/10 6:00	339.2	12/5/10 21:00	294.32
	11/14/10 12:00	705.3	11/25/10 7:00	339.0	12/5/10 22:00	294.48
	11/14/10 13:00	719.5	11/25/10 8:00	342.4	12/5/10 23:00	293.22
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					12/6/10 10:00	310.61
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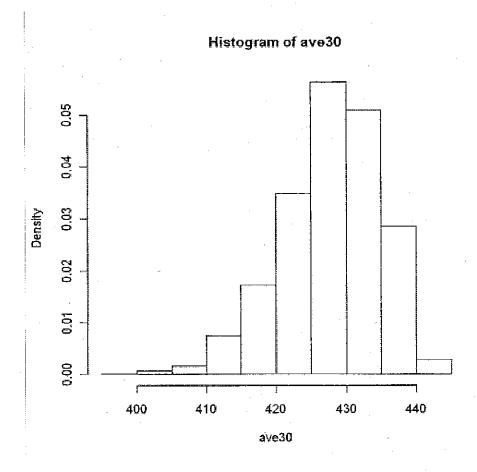
p. Dept. production of the pro		andalah per	tichen untvertellert.				
Count 1	62	Count 179	Maria Maria Maria Maria da Maria da Maria da Maria Maria Maria Ma Maria Maria Ma Maria Maria Mar	Count	178	Count	193
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<b>UPL 99%</b> 5	65.69	UPL 99% 737.	84		338.28	UPL 99%	
11(1 99% 5	5177	HCI 99% 771	46	HCI 99%	330.82	HCI 99%	701 //5

Line 1 Bootstrap Information

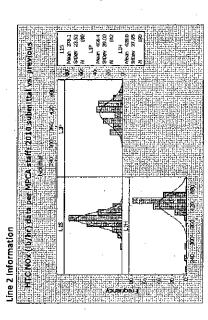
Classic prediction interval calculation for				30 new data	points
Mean	Stdev	Count	alpha	2-tail t	upper level
428.0	37.95	190	0.01	2.602	447.4
			0.05	1.973	442.7

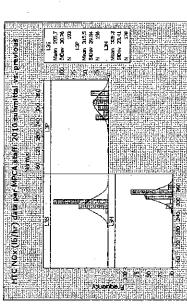
# **Bootstrap results with 2000 replicates**

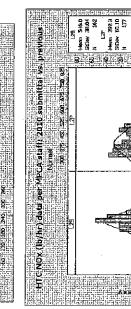
Tool	Mean	SE(ave30)	alpha	2-tail z		upper level
Excel 2007	428.0	6.891	0.01		2.576	445.8
•			0.05		1.960	441.5



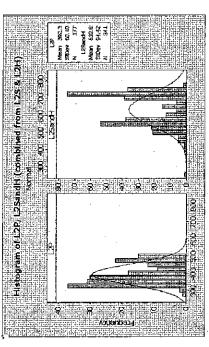
Draft







642.0 642.9 566.7 562.9 916.5 829.0	Using L25 and L2H Data (2010) Use of the 2-tail 99% confidence level for the fitted normal pattern Mean 632.8 2-tail 2 <sub>0.01</sub> 2.576 2-tail 99% UCL Stdev 94.42 2-tail 2 <sub>0.05</sub> 1.960 2-tail 95% UCL Count 341 Using the combined L2P, L2S, and L2H Data Mean 550.7 Count 51.8  For predicting the next single data point 5-tail 99% UPL 2-tail 99% UPL	Using L.25 and L2H Data (2010)  Use of the 2-tail 99% confidence level for the fitted normal pattern  Mean 632.8 2-tail z <sub>0.01</sub> 2.576 2-tail 5  Stdev 94.42 2-tail z <sub>0.05</sub> 1.960 2-tail 5  Count 341  Using the combined L2P, L2S, and L2H Data  Mean 550.7  Stdev 141.9  Count 51.8  For predicting the next single data point 2-tail 5  2-tail 5  Por predicting the next 30 data points - representing a 30 data point 2-tail 5	Using L.25 and L.2H Data (2010) Use of the 2-tail 99% confidence level for th Mean 632.8 2-tail $z_{0.01}$ Stdev 94.42 2-tail $z_{0.01}$ Count 34.1 Using the combined L.2P, L.25, and L.2H Data Mean 550.7 Stdev 141.9 Count 51.8 For predicting the next single data point	Using L2S in Use of the Mean Stdev Count Using the Mean Stdev Count For predict
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	ed normal pattern	lence level for the fitte	2-tail 99% conflo	e of the
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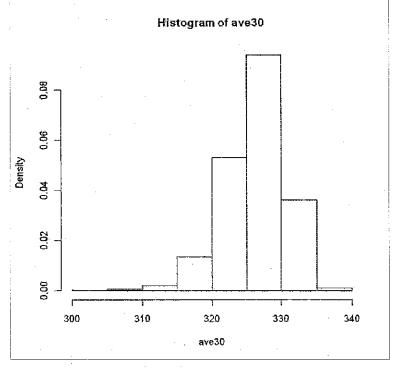


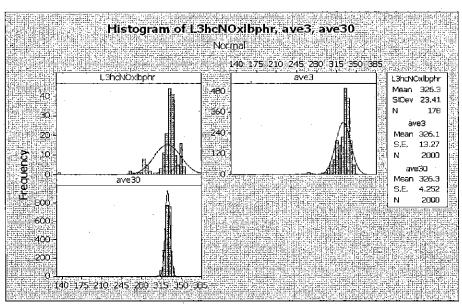
#### Line 3 Bootstrap Information

Classic pred	liction inter	val calculat	ion for	30 new data	points
Mean	Stdev	Count	alpha	2-tail t	upper level
326.3	23.41	178	0.01	2.604	338.3
			0.05	1 973	335.4

# Bootstrap results with 2000 replicates

Tool	Mean	SE(ave30)	alpha	2-tail z	upper level
Excel 2007	326.3	4.252	0.01	2.576	337.2
		*	0.05	1.960	334.6





SF-00006-05 (4/86

DEPARTMENT: POLLUTION CONTROL AGENCY

STATE OF MINNESOTA Office Memorandum

DATE: November 30, 2011

TO: AQD File No. 27A

(Delta ID No. 07500003)

FROM: Hongming Jiang

Catherine Neuschler

Air Quality Permits Section

**Industrial Division** 

Air Assessment and Environmental Data Management Section

**Environmental Analysis and Outcomes Division** 

PHONE: 651-757-2467

651-757-2607

SUBJECT:

Nitrogen Oxides BART Limits for Northshore Mining Company (NSM)

This memo was prepared to provide the documentation of the MPCA's  $NO_X$  BART limit determination based on the technical review performed by MPCA staff. EPA's approval of the Regional Haze State Implementation Plan (SIP) for Minnesota is needed for the MPCA's BART determination to become effective.

#### 1. General Information

#### 1.1 Applicant and Stationary Source Location:

Applicant/Mailing Address	Stationary Source (SIC: 1011)/Address		
Northshore Mining Company	Northshore Mining Company		
10 Outer Drive	10 Outer Drive		
Silver Bay, MN 55614	Silver Bay, MN 55614, Lake County		
Contact: Mr. Scott Gischia; Phone: (218) 226-6076			

#### 1.2 <u>Description of the Facility</u>

Northshore Mining Company's (NSM) Silver Bay facility is located on the north shore of Lake Superior. It was the first taconite operation in Minnesota, originally built in the mid-1950s by Reserve Mining Company. Cleveland Cliffs, Incorporated purchased the facility from Cyprus Minerals in 1994; Cleveland Cliffs now owns and operates the facility.

NSM has four indurating furnaces. Furnaces 11 and 12 began operating in 1963, a few years after Furnaces 5 and 6 started operation. However, Furnace 5 was shut down for several years; in 2006, NSM received a Prevention of Significant Deterioration permit authorizing the restarting of Furnace 5. Furnaces 11 and 12 were manufactured by Arthur G. McKee and are NSM's largest indurating furnaces. They each burn a maximum of 150 MMBtu/hr of natural gas and are capable of processing 300 tons of pellets per hour.

NSM also operates two process boilers that are subject to BART. Both process boilers were installed in 1965 and are rated at 79 MMBtu/hr. The boilers are capable of burning fuel oil and natural gas.

# 2. Regulatory and/or Statutory Basis

# 2.1 Overview of Visibility, Regional Haze, and Best Available Retrofit Technology Program

The U.S. EPA's 1999 Regional Haze Rule singles out certain older emission sources that have not been regulated under other provisions of the Clean Air Act for additional controls. The MPCA is required to determine Best Available Retrofit Technology (BART) for these older sources that contribute to visibility impairment in Class I Areas to install Best Available Retrofit Technology (BART). On July 6, 2005, U.S. EPA published a revised final rule, including 40 CFR 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which older sources may need to install BART and for determining BART.

The MPCA is required to determine BART for each source subject to BART based on an analysis of the best system of continuous emission control technology available and associated emission reductions achievable. The analysis must take into consideration the technology available, the costs of compliance, the energy and non-air quality environmental impacts, any pollution control equipment in use at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from use of the technology.

Further discussion of the regulatory basis for this determination can be found in the MPCA's December 2009 Regional Haze State Implementation Plan submittal, in Appendix 9.3.

#### 2.2 Affected Units

The units for which the MPCA must determine BART and establish a NO<sub>X</sub> BART limit consistent with that determination is

Emission Unit Name	EU Number	Control Equipment and Stack Numbers
Indurating Furnace #11 – Hood Exhaust	EU100	SV101, SV102, SV103
Indurating Furnace #11 – Waste Gas	EU104	SV104, SV105
Indurating Furnace #12 – Hood Exhaust	EU110	SV111, SV112, SV113
Indurating Furnace #12 – Waste Gas	EU114	SV114, SV115
Process Boiler #1	EU003	SV003
Process Boiler #2	EU004	SV003

#### 2.3 The BART Determination

The MPCA's  $NO_X$  BART determinations for these units are documented in Appendix 9.3 of the December 2009 Regional Haze SIP submittal. The BART  $NO_X$  determination for the process boilers is existing design and permitted fuels. The BART  $NO_X$  determination for the indurating furnaces is good combustion practices.

However, due to the lack of sufficient emissions data representing the range of operating conditions that influence emissions, the MPCA did not set an emission limit at the time of making the BART determination for the indurating furnaces. Instead, the MPCA and NSM entered into an Administrative Order, under which NSM provided additional NO<sub>X</sub> emission information to the MPCA.

#### 2.4 MPCA Determination of the BART Limit

The BART limit for the process boilers was previously determined and is 0.17 lbs  $NO_x/MMBtu$  heat input; no  $SO_2$  limit was set as the process boilers burn only natural gas and low sulfur distillate fuel oil. The  $SO_2$  BART limit for the furnaces was previously determined and is 0.0651 lb  $SO_2$  per long ton of pellets fired (finished) that applies only when the company is burning natural gas.

The MPCA reviewed the  $NO_X$  emission information from the indurating furnaces provided by NSM. Under the previously mentioned Administrative Order, NSM was required to collect "a minimum of 150 one-hour data points under the range of [furnace] operating parameters that influence  $NO_X$  emissions. The range of each operating parameter during testing should be representative of furnace's operating range for the parameters in the 12 months previous to testing." This requirement was to ensure that the emissions data collected was appropriately representative of the range of operating conditions for the furnace. Method 7E stack tests were conducted in April and May 2008 and July 2009. The 2008 tests collected over 150 data points for each furnace, while the 2009 tests were shorter (30 data points).

The BART limit, in the form of a mass emission rate of  $NO_X$  in lbs/hour for each furnace, was developed based on the 2008 data, with the 2009 data used to check and further support the limit.

The data was analyzed to determine different limits that would be appropriate based on different compliance test durations. The MPCA believes the most appropriate compliance test would involve obtaining at least 30 hourly-averaged data points, as obtained by NSM in the 2009 stack testing. Using 30 data points also tends to reduce data fluctuations.

The process of calculating the BART limit for Furnace 11 began by constructing a 99% confidence interval and taking the upper prediction level. The MPCA believes the use of a 99% upper predictive level for setting the limit is appropriate, due to the need for limits to be met during all operating conditions, including during times of startup, shutdown, and malfunction.

The sample calculation below is for the 99% confidence interval:

Mean of 30 data points = 
$$\overline{X}$$
 +  $[2.604 \times \overline{\sigma} \times \sqrt{(\frac{1}{30} + \frac{1}{176})}]$ 

- Where  $\overline{X}$  and  $\overline{\sigma}$  are, respectively, the mean and standard deviation of the sample of 176 hourly-averaged NO<sub>X</sub> data points of 2008 for Furnace 11;
- The value 2.604 is the 2-tail percentage point of the t-distribution with a level of significance of 0.01 and 175 degrees of freedom;
- $\sqrt{(\frac{1}{30} + \frac{1}{176})}$  is used to relate the sample sizes for the intended compliance test and the 2008 Furnace 11 data set; and
- The resultant value is the recommended limit as the mean of 30 hourly-averaged data points.

Northshore Mining NO <sub>x</sub> Stack Test Values (in lbs/hour)				
	Furnace 11	Furnace 12		
May 2008 Stack Test				
# Data Points	176	158		
Mean	111.0	98.9		
St Dev	8.7	10.3		
Max Value	130.4	130.0		
Min Value	73.5	87.5		
99% Interval UPL	115.9	115.8		
July 2009 Stack Tests				
# Data Points	35	32		
Mean	94.0	90.1		
St Dev	3.8	2.5 .		
Max Value	102.0	95.5		
Min Value	87.8	85.4		
99% Interval UPL	93.85	87.6		

The MPCA conducted additional analysis in order to help alleviate concerns that any one stack test, even an extended stack test, cannot capture all of the anticipated furnace operating conditions. This was done through the use of bootstrapping, a resampling technique designed to replicate the taking of multiple samples of the same size from a population.

This technique uses the data points from the 150 hour (or greater) stack test as a representative population, from what multiple samples of 30 data points are drawn. A random number generator was used to select the hourly data points used in constructing each 30 data point sample. A total of 2000 sets of 30 hourly data points were generated. The mean of each 30 point data set was then used to make a new, larger, sample of 2000 data points to represent the overall "population" of potential emission levels. This was repeated several times, both in Excel and using the R statistical package.

Each of the surrogate populations thus created had a different standard error. Standard error is the standard deviation of a summary statistic, or a measure of the precision of the estimate. So, in essence, the variability of the standard error for each of these surrogate populations gives a sense of how much the sample mean may differ from the "true" or population mean. In the bootstrapping technique, the standard error of datasets of 30 points drawn the new surrogate population (built from the mean of each of 2000 randomly selected 30 data point sample sets) ranged from 1.563 to 1.616 for Furnace 11 and from 1.883 to 1.896 for Furnace 12.

The MPCA then looked at the analyses with varying standard error, and used that standard error (se) and the mean of the original data point sample to develop additional 99% UPLs. Because of the large number of data points, this was calculated with a z-statistic, rather than the t-statistic used above. The z-statistic at  $\alpha$  = 0.01 is 2.576. This calculation is:  $\overline{X} + [2.576 \times se]$ . For the data from Nortshore, this is:  $110.0 + [2.576 \times 9.269]$ .

Using the different standard errors, the 99% UPLs for Line 11 are all around 115 lbs/hour. The 99% UPLs for Northshore are all around 103 to 104 lbs/hour. Based on the MPCA's experience in analyzing data from these units, the recommended limit for Furnace 12 is the same as that for Furnace 11, although completing the calculation shown above would result in a slightly lower value for Furnace 12.

After reviewing stack test data provided by NSM, the MPCA has determined that an appropriate BART  $NO_x$  limit is that derived from the standard 99% UPL. This limit is supported by the bootstrap analysis. Therefore, the BART limit for Northshore is 115.5 lbs/hour per furnace; this limit is a 30-day rolling average.

Compliance is to be determined through  $NO_X$  performance testing, simultaneously measured from all five furnace stacks at each of the two furnaces for 30 hourly data points.

																																Histogram of Combined NOx, lb/hr						/			<b>1</b>				7								
	0000	6007	2	ř	107.0	87.8	2 032	20.20	25.56	27.70	93.85		2009	90 1	2.5	32	95.5	85.4	2.040	91,40	2.744	87.62										mbined	7-				(							सम्ब	Ox. b.h								
	0001	2008	27	176	130.4	73.5	1 074	117.45	11444	5,504	115.97		BUUZ	98.9	10.3	158	130.0	87.5	1.975	114.49	2.608	115.86			103.1	11.5	401	130.4	C:e/			gram of Co		- T-			4								Gordoned A								
Descriptive Statistics	3	Furnace 11	Avelage cimissions, los/mous	tario C	Mayim lbs/hour	Minimum Bs/hour		0.05, C1		<sup>1</sup> 0.01, e-1	J40 %66		L 625 (127)	Average Emissions The/hour	Strate	Count	Maximum lbs/hour	Minimum lbs/hour	t <sub>0,05, C-1</sub>	95% UPL	b.a., e-1	39% UPL		All Data Combined	All para compilied Average Emissions, Ibs/hour	Stdev	Count	Maximum lbs/hour	Minimum ips/nour	10000		T					23. EL	) ) ) (							678 00								
Testing Total Emission	Atal Emission	Rate, ID/ nr	4.40	91.4	92.1	5.56		0.00	0.26	92.8	5.06	e: 05.	94.0	0.50	5 PG	89.2	88.8	1,68	4,68	000	30.2	B8 60	E 98	0.00	89.3	87.8	85.7	7'68	20 g 4. 0	87.3	85.4																						
2009 Stack Testing			07/25/09 10:00	00:51 00/05/70	07/24/09 12:00	07/24/09 14:00	03/36/36/26	00,21 50/01/10	07/29/09 18:00	0//29/09 1/:00	07/29/09 18:00	07/29/09 19:00	00:02 60/67/70	01/26/06/20	07/24/09 23:00	00:00 60/26/20	07/30/09 01:00	07/30/09 02:00	00/06/08 03:00	07/30/09 04:00	07/30/09 05:00	07/30/09 06:00	07/30/09 07:00	07/30/03/08/09	07/30/09 10:00	00/11:00/06/20	07/30/09 12:00	00/30/00 13:00	07/30/09 14:00	00/30/09 16:00	00/30/06/20													-				٠					
c Testing Total Emirrian Bato	otal Emission Kate,	lb/hr	1,16.2	1,521	125.6	127.1	1.71	128.0	1,821	127.2	126.9	128.3	130.1	110 /	0.811.	117.2	117.0	117.0	105.7	102.2	98.1	96.3	92.8	6.19 0.30	93.0	8.96	93.8	96.4	94.6	87.8	92.3	92.3	92.9	91.3	91.7	90.2	9.68	86.58 E. 86	0.66	90'8	6.98	93.6	/:56	88.7	88.4	89.5	88.5	91.2	91.7	95.3	. 93.2	. E.1.9	
2008 Stack Testing	:	Date and Time	4/22/08 20:00	00:T2 90/27/4	4/22/00 22:00	00:030/57/6	00,000,00%	4/23/06 I,00	4/23/08 2:00	4/23/08 3:00	4/23/08 4:00	4/23/08 5:00	4/23/08 6:00	4/23/08 7:00	4/73/08 9:00	4/23/08 10:00	4/23/08 11:00	4/23/08 12:00	4/23/08 13:00	4/23/08 14:00	4/23/08 15:00	4/23/08 16:00	4/23/08 17:00	4/23/08 18:00	4/23/08 20:00	4/23/08 21:00	4/23/08 22:00	4/23/08 23:00	4/24/08 0:00	4/24/0R 7:00	4/24/08 3:00	4/24/08 4:00	4/24/08 5:00	4/24/08 6:00	4/24/08 /:00 4/24/08 8:00	4/24/08 9:00	4/24/08 10:00	4/24/08 11:90	4/24/08 13:00	4/24/08 14:00	4/24/08 15:00	4/24/08 16:00	4/24/08 17:00	4/24/08 19:00	4/24/08 20:00	4/24/08 21:00	4/24/08 22:00	4/24/08 23:00	4/25/08 0:00	4/25/08 2:00	4/25/08 3:00	4/25/08 4:00	The state of the s
Testing	I OTAI EMISSION	Rate, lb/hr	5 T	S 1.0	7.00	0.20	0.76	0.001	3.69	94.6		80.8	92.2	90.4	3.06	E 66	99,4	95.1	92.0	89.7	93.1	0.06	89.8	1,880 1,100 1,00 1,00 1,00 1,00 1,00 1,00 1,00 1,00 1,00 1,00 1,00	93.2	89.3	5.06	91.7	93.6	9 6	102.0	97.3	98.6	101.4	- C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C-C																		
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(Testing	i otal emission	Rate, ib/hr	104.2	103,1	110.0	1110	0 1 1	7.077	113.5	113.5	113.1	100.6	116.4	112.7	1,000	107.1	106.5	109.0	108.0	104.6	105.5	108.8	106.9	110.5	0.5.0	96.4	57.5	98.3	108.8	113.2	101.6	98.7	101.3	103.2	2,299 906	106.7	106.9	109.5	111.2	115.5	113.4	118.1	124.2	125.0	129.5	130.4	129.7	129.2	123.4	116.6	112.0	112.0	7111
2008 Stack Testing	į	Date and Time	5/15/08 0:00	5/15/08 1:00	5/15/08:2:00	5/15/08 5:00	3/12/08/4:00	5/15/08 5:00	5/15/08 6:00	5/15/08 7:00	5/15/08 8:00	5/15/08 9:00	5/15/08 10:00	5/15/08 11:00	5/15/08 12:00	5/15/08 14:00	5/15/08 15:00	5/15/08 16:00	5/15/08 17:00	5/15/08 18:00	5/15/08 19:00	5/15/08 20:00	5/15/08 21:00	5/15/08 22:00	5/16/08 23:00 5/16/08 0:00	5/16/08 1:00	5/16/08 2:00	5/16/08 3:00	5/16/08 4:00	5/16/08 6:00	5/16/08 7:00	5/16/08 8:00	5/16/08 9:00	5/16/08 10:00	5/16/08 11:00	5/16/08 13:00	5/16/08 14:00	5/16/08 15:00	5/16/08 17:00	5/16/08 18:00	5/16/08 19:00	5/16/08 20:00	5/16/08 21:00	5/16/08 22:00	5/17/08 0:00	5/17/08 1:00	5/17/08 2:00	5/17/08 3:00	5/11/08 4:00	3/1//08 5:00 5/17/08 6:00	5/17/08 7:00	5/17/08 8:00	***

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,	0.007	110.9	104.5	104.1	100.1	101.1	103.0	106.0	106.5	105.7	107.4	103.0	103.5	103.B	103.3	105,9	114.3	97.5	98.2	108.0	107.1	106.8	7.701	110.7	106 3	110.3	113,1	6.711	118.3	120,5	120.2	111.6	107.2	106.1	111.9	109.4	112.2	107.6	102.1	104.2	106.5	110.0	112.3	115.3	126.2	126.7	126.4	125.7	126.7	129.3	128.0	117.6	120.5	121.6	118.7	119.8
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1 47	77/0	5/1/2	5/17/	5/17	5/17	5/17,	5/17,	5/17,	5/17,	5/17,	5/17	5/18	5/18	5/18	5/18	3/18	5/18	37/6	5/18	5/18	5/18,	5/18	5/18	5/18	5/18	5/18	5/18	5/18	5/18,	5/18,	5/18	5/18	5/15	5/18	5/18	5/16	5/15 5/16	5/15	5/18	5/18	5/16	5/19	5/19	5/19	5/19	5/19	5/19	51/5 51/19	5/19	5/19,	5/19,	5/19	5/19,	2/50	5/20	2/50

5/20/08 4:00	118.0	4/28/08 0:00	10,
5/20/08 5:00	120.8	4/28/08 1:00	100
5/20/08 6:00	114.5	4/28/08 2:00	100
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5/20/08 20:00	104,9	4/28/08 16:00	10
5/20/08 21:00	107.2	4/28/08 17:00	10
5/20/08 22:00	107.0	4/28/08 18:00	66
5/20/08 23:00	109.6	4/28/08 19:00	66
5/21/08 0:00	113,0	4/28/08 20:00	66
5/21/08 1:00	120.6	4/28/08 21:00	86
5/21/08 2:00	120,6	4/28/08 22:00	86
5/21/08 3:00	122.5	4/28/08 23:00	ğ
5/21/08 4:00	118.4	4/29/08 0:00	71
5/21/08 5:00	117.8	4/29/08 1:00	m
5/21/08 6:00	121.2	4/29/08 2:00	45
5/21/08 7:00	123.9	4/29/08 3:00	8
5/21/08 8:00	116.4	4/29/08 4:00	76
5/21/08 9:00	119.0	4/29/08 5:00	76
5/21/08 10:00	119.9	4/29/08 6:00	8
5/21/08 11:00	117.7	4/29/08 7:00	87
5/21/08 12:00	119.9	4/29/08 8:00	96
5/21/08 13:00	118.8	4/29/08 9:00	96
5/21/08 14:00	118.5	4/29/08 10:00	66
5/21/08 15:00	120.7	4/29/08 11:00	8
5/21/08 16:00	123.5	4/29/08 12:00	₩.
5/21/08 17:00	121.4	4/29/08 13:00	E
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5/22/08 3:00	113.5		
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5/22/08 5:00	117.5		
2/22/08 6:00	116.7		•
5/22/08 7:00	114.2		

Furnace 11: Classic Predictive Interval Calculations for 30 data Points

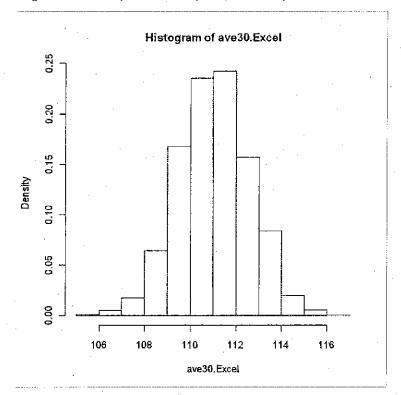
Mean	Stdev	Count	alpha	2		upper level
111.04896	8.747557	176.	0	0.01	2.604	115.5
				. 0.05	1.974	114.5

Furnace 11: Bootstrap Results: 2000 replicates based on NOx lbs/hour Data

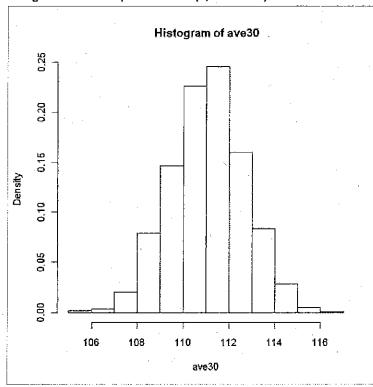
	•		alpha		unner level
Excel 2007		•	-		
LXCEI 2007	111.0	1,303	0.01		
•			0.05	1.960	114.1
R	111.0	1.612	0.01	2.576	115.2
			0.05	1.960	114.2
R	111.0	1.616	0.01	2.576	115.2
			0.05		
	•		0.03	1.500	114.2
R	111.0	1.604	0.01	2.576	115.2
<b>v</b>			0.05	1.960	114.2
R	111.0	1.581	0.01	2.576	115.1
	111.0	2.002	0.05		
			0.03	1.500	114.1
R	111.0	1.605	0.01	2.576	115.2
			0.05	1.960	114.2
R	111.0	1.616	0.01	2.576	115.2
	111.0	1.010	0.05		
			0.03	1.500	114.2
R	111.0	1.590	0.01	2.576	115.1
			0.05	1.960	114.2
R	111.0	1.566	0.01	2.576	115.1
	111.0	1.500	0.05		
			0.03	1.700	117.1
R	111.0	1.570	0.01	2.576	115.1
		•	0.05	1.960	114.1

```
> dataframe<-read.csv("C:\\Documents and
Settings\\hjiang\\Desktop\\Data_R.csv",header=T)
> names(dataframe) # A column of 176 values for Furnace 11
[1] "F11NOxlbphr"
> attach(dataframe)
> # set up the bootstrap
> B <- 2000 # number of bootstrap replicates
> n <- 30 # sample size, i.e., 30 data points as proposed by the MPCA
> ave30 <- numeric(B) # storage for bootstrap replicates
> # bootstrap estimate of standard error of ave30
> for (b in 1:B) {
+ # randomly select the indices
+ i <- sample(1:176, size=n, replace=T) # i is a vector of indices
+ ave30[b] <- mean(F11NOxlbphr[i]) # calc mean for each replicate
+ }
> # output
> print(se.ave30 <- sd(ave30))
                                        # standard error (ave30)
[1] 1.612113
> hist(ave30, prob=T)
Notes: When I run the above commands plus added:
> set.seed(11)
before entering the "> B <- 2000" command, I got:
[1] 1.616225
```

# Histogram of Bootstrap Distribution (Excel, se = 1.563)



# Histogram of Bootstrap Distribution (R, se = 1.612)



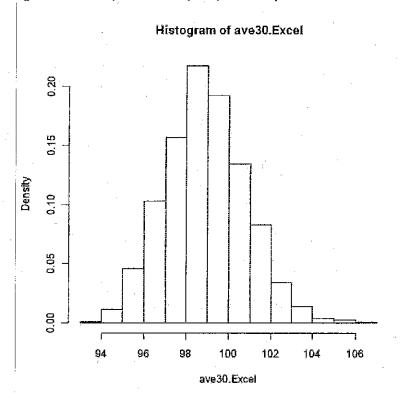
Furnace 12: Classic Predictive Interval Calculations for 30 data Points

Mean		Stdev	Count	alpha		2-tail t	upper	evel
	98.9	10.318	15	8 (	0.01	2.608		104.3
				(	0.05	1.975		103.0

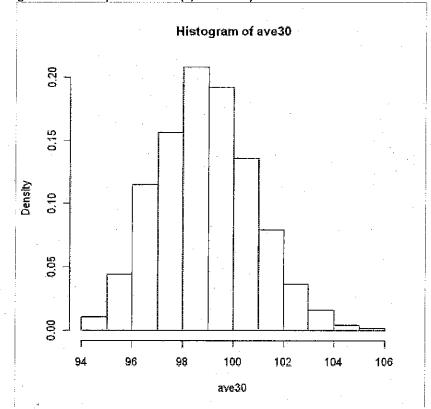
Furnace 12: Bootstrap Results: 2000 replicates based on NOx lbs/hour Data

Tool	Mean	SE(ave30)	alpha	2-tail z	upper level
Excel 2007	98.9	1.883	0.01	2.576	103.8
			0.05	1.960	102.6
R	98.9	1.896	0.01	2.576	103.8
*			0.05	1.960	102.7
R	98.9	1.894	0.01	2.576	103.8
•			0.05	1.960	102.7
R	98.9	1.883	0.01	2.576	103.8
			0.05	1.960	102.6

# Histogram of Bootstrap Distribution (Excel, se = 1.883)



# Histogram of Bootstrap Distribution (R, se = 1.896)



SF-00006-05 (4/86)

DEPARTMENT: POLLUTION CONTROL AGENCY

STATE OF MINNESOTA Office Memorandum

DATE:

December 12, 2011

TO:

AQD File No. 869A (Delta ID No. 13700113)

FROM:

Hongming Jiang

Catherine Neuschler

Air Quality Permits Section

Air Assessment and Environmental Data Management Section

Industrial Division

**Environmental Analysis and Outcomes Division** 

PHONE:

651-757-2467

651-757-2607

SUBJECT:

BART Limits for United Taconite (UTac)

This memo was prepared to provide the documentation of the MPCA's  $NO_X$  BART limit determination based on the technical review performed by MPCA staff. EPA's approval of the Regional Haze State Implementation Plan (SIP) for Minnesota is needed for the MPCA's BART determination to become effective.

#### 1. General Information

## 1.1 Applicant and Stationary Source Location:

Applicant/Mailing Address	Stationary Source (SIC: 1011)/Address
United Taconite LLC – Fairlane Plant	Highway 16
P.O. Box 180	Forbes, Minnesota 55738
Eveleth, Minnesota 55734-0180	St. Louis County
Contact: Ms. Candice Maxv	well; Phone: (218) 744-7849

## 1.2 Description of the Facility

The United Taconite, LLC (UTac) facility processes crude taconite ore into a pellet product with ore supplied from a rail-linked facility, UTac's Thunderbird Mine. Fine crushing and grinding of crude ore and magnetic separation processes produce a taconite concentrate, which is used to make pellets. Taconite pellets are thermally hardened in a grate-kiln indurating furnace. The finished product (fired pellets) is transferred by conveyors to storage bins for holding and loading into railcars.

This facility has two indurating Allis-Chalmers furnaces. Line 1 is the smaller of the two, with a rated throughput of 280 tons of pellets per hour and a heat input of 190 MMBtu per hour of natural gas. The newer line, Line 2, is rated at 672 tons per hour with a heat input from natural gas, coal, petroleum coke, and other fuels of 400 MMBtu per hour.

## 2. Regulatory and/or Statutory Basis

### 2.1 Overview of Visibility, Regional Haze, and Best Available Retrofit Technology Program

The U.S. EPA's 1999 Regional Haze Rule singles out certain older emission sources that have not been regulated under other provisions of the Clean Air Act for additional controls. The MPCA is required to determine Best Available Retrofit Technology (BART) for these older sources that contribute to visibility impairment in Class I Areas to install Best Available Retrofit Technology (BART). On July 6, 2005, U.S. EPA published a revised final rule, including 40 CFR 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which older sources may need to install BART and for determining BART.

The MPCA is required to determine BART for each source subject to BART based on an analysis of the best system of continuous emission control technology available and associated emission reductions achievable. The analysis must take into consideration the technology available, the costs of compliance, the energy and non-air quality environmental impacts, any pollution control equipment in use at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from use of the technology.

Further discussion of the regulatory basis for this determination can be found in the MPCA's December 2009 Regional Haze State Implementation Plan submittal, in Appendix 9.3.

### 2.2 Affected Units

The units for which the MPCA must determine BART and establish a NO<sub>x</sub> BART limit consistent with that determination are:

Emission Unit Name	EU Number	Stack Numbers
Line 1 Pellet Induration	EU040	SV046
Line 2 Pellet Induration	EU042	SV048, SV049

## 2.3 The BART Determination

When the MPCA submitted the original Regional Haze SIP (December 2009), the Line 1 indurating furnace was able to burn both natural gas and fuel oil, but natural gas was the primary fuel. Since natural gas is low in sulfur, the primary source of sulfur at the Line 1 furnace was the iron ore used to form the green balls. Some additional sulfur may be present in additives also used in the green balls. Based on this operating scenario, the MPCA's SO<sub>2</sub> BART determination for Line 1 was current operation of the wet scrubbers, with a corresponding emission limit of 0.121 lbs SO<sub>2</sub>/long ton of pellets produced.

The Line 2 indurating furnace is permitted to burn pulverized coal, a coal/pet coke blend, distillate oil, and natural gas. It is primarily operated using a blend of coal and pet coke. Therefore, the primary source of sulfur at this furnace is the fuel, though the iron ore also contributes some sulfur to the waste gas. The MPCA's SO<sub>2</sub> BART determination for Line 2 was for fuel blending to reduce SO<sub>2</sub> emissions, with a corresponding emission limit of 1.7 lbs/MMBtu.

The MPCA's BART determinations for the pellet induration furnaces are documented in Appendix 9.3 of the December 2009 Regional Haze SIP submittal.

The MPCA's  $NO_X$  BART determination for Line 1 is good combustion practices and implementation of a past heat recuperation project. The MPCA's  $NO_X$  BART determination for Line 2 is good combustion practices. However, due to the lack of sufficient emissions data representing the range of operating conditions that influence emissions, the MPCA did not set an emission limit at the time of making the BART determination.

Instead, the MPCA and UTac entered into an Administrative Order, under which UTac provided additional  $NO_X$  emission information to the MPCA. Subsequently, UTac was required a Stipulation Agreement to install Continuous Emission Monitoring Systems (CEMS) on both lines. UTac certified the CEMS in late 2010, and began reporting information to the MPCA in 2011.

#### 2.4 MPCA Determination of the "Baseling" BART Limit

Setting the BART limits for United Taconite is a two-step process, because of a planned change in facility operations. The MPCA was unable to find guidance on how to evaluate appropriate BART limits for a modifying facility, particularly in this case where the BART determinations were made but data was not available to set matching emission limits.

The first step was to determine a "baseline BART" – BART for the unmodified facility. The MPCA reviewed the  $NO_X$  emission information provided by UTac. Although some data was received for November and December 2010, the MPCA focused on emission data from January through June 2011.

The 30-day rolling average of  $NO_X$  emissions from the two lines at UTac does not fit any standard statistical probably curve. Therefore, the calculation to set the emission limit was done based on a normal curve. For Line 1, a 95% confidence interval was constructed, and the upper prediction level was used to the set the BART limit. For Line 2, a 99% confidence interval was constructed, and again the upper prediction level was used to develop the BART limit. The upper prediction level was used, rather than the upper confidence level, due to the fact that compliance requires "gap filling" of missing data. This was not done in the CEMS data submittals thus far. The fact that gap filling was not completed and that a limited amount of data is available, means that the available data likely does not demonstrate the entire range of data. Because of these limitations of the data, the upper prediction level is more appropriate to use, and creates a limit that is slightly above the maximum emissions level shown in the available data. (A 99% confidence interval was used for Line 2 in order to ensure that the upper prediction level is above the maximum demonstrated emissions level.)

	NO <sub>x</sub> Emissions De	=	CS
	Line 1 NO <sub>X</sub>	Line 2 NO <sub>x</sub>	Line 2 NO <sub>x</sub>
		(Stack A)	(Stack B)
# Data Points	111	142	181
Minimum	552.27	98.41	82.84
Mean	743.04	215.20	196.41
Standard	138.27	70.11	58.18
Deviation			
Maximum	952.33	364.14	345.01

After reviewing the CEMS data provided by UTac, the MPCA has determined that appropriate baseline BART  $NO_X$  limits are: 1018.3 lbs/hour for Line 1, and 753.8 lbs/hour for Line 2. Along with the emission limits set in the original SIP submittal, the baseline BART emission limits for the facility are as follows:

UTa	ic Baseline BART Emission (30 day rolling averag	
,	Line 1	Line 2
SO <sub>2</sub> BART Limit	0.121 lbs/LT pellet	1.7 lbs/MMBtu
NO <sub>x</sub> BART Limit	1018.3 lbs/hour	753.8 lbs/hour

## 2.5 Facility Changes and the BART Limit

In August 2010, after the MPCA determined the BART work practices and controls for UTac, the facility received a permit amendment that allows for the use of solid fuels on Line 1 and a facility-wide production increase.

Because of this change, certain requirements were placed in the amended permit. Within 120 days of receiving a memo documenting the baseline BART limits set in part 2.4 from the MPCA, UTac must submit to the MPCA a permit application to incorporate into its air emission permit either 1) NO<sub>X</sub> and SO<sub>2</sub> BART emission limits as described in this memo or 2) a BART alternative as described in the December 2009 Regional Haze SIP submittal. Alternatively, UTac may submit within 120 days an updated BART analysis based on the modified Lines 1 and 2 for the facility with an appropriate permit amendment application to incorporate the BART limits proposed in that update analysis. The MPCA sent documentation of the initial BART limits on September 22, 2011.

On December 8, 2011, UTac provided MPCA with a proposal requesting that the permit limits from the permit issued in August 2010 be used as the BART limits for the facility.

	UTac Proposed BART Emiss	ion Limits
	Line 1 (EU040)	Line 2 (EU042)
SO <sub>2</sub> Limit	106.3 tons as a 30-day rolling sum	197 tons as a 30-day rolling sum
NO <sub>x</sub> Limit	816 tons as a 180-day rolling sum	1820 tons as a 180-day rolling sum

UTac and MPCA then calculated the emission reductions that would result from this proposal, compared to the MPCA's original BART proposal. The following table shows the MPCA's calculation of annual emissions from the facility prior to BART, using baseline actual emissions (Past Emissions), the MPCA's baseline BART proposal, and UTac's BART proposal. These were calculated using the maximum pellet production and heat input for each furnace.

		ssions from ull Furnace	UTac (tons pe Capacity¹	r year)		
	Line	· 1	Line	2	To	tal
	$NO_X$ $SO_2$ $NO_X$ $SO_2$ $NO_X$ $SO_2$					SO <sub>2</sub>
Past Emissions <sup>2</sup>	4371	38	1968	7008	6338	7046
MPCA Baseline BART	4460	148	3302	2978	7762	3127
UTac BART Proposal	1655	1293	3692	2394	5347	3687

This demonstrates that the MPCA's baseline BART proposal is essentially unconstraining, except for the  $SO_2$  emissions limit for Line 2. Compared to past actual emissions, the MPCA's baseline BART proposal results in about a 2500 tons per year decrease in overall emissions of  $NO_X$  and  $SO_2$ . The proposal by UTac results in a 4350 tons per year decrease in overall emissions as compared to the past emission scenario, and 1855 tons per year as compared to MPCA's BART determination.

However, because visibility is looked at in terms of best and worst days, a shorter-term limit is needed for emissions averaging. The generally accepted averaging time for BART limits is a 30-day rolling average.

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<sup>&</sup>lt;sup>1</sup> Estimates of emissions for the past emissions and MPCA proposals were done using the maximum furnace throughput and assuming 8760 hours of operation annually.

 $<sup>^2</sup>$  Because the facility does not have NO<sub>X</sub> emission limits, the past emissions for NO<sub>X</sub> were estimated using baseline actuals from the August 2010 permitting action. Line 1 SO<sub>2</sub> unlimited emissions were estimated the same way, while Line 2 SO<sub>2</sub> unlimited emissions were estimated using the statewide 4.0 lbs/MMBtu emission limit, which is higher than the baseline actuals of 3652 tpy.

The following table looks at the past emissions and the MPCA and UTac BART proposals on a tons per day basis, at full furnace capacity.

Daily Er	nissions from Full Furnace		er day)	
	Line	e 1	Line	2
	NO <sub>x</sub>	SO <sub>2</sub>	, NO <sub>X</sub>	SO <sub>2</sub>
Past Emissions <sup>4</sup>	11.97	0.10	5.39	19.20
MPCA Baseline BART	12.22	0.41	9.05	8.16
UTac BART Proposal	4.53	3.54	10.11	6.57

Although this scenario raises the  $SO_2$  limit on Line 1 to account for the addition of solid fuels, it results in lower  $NO_X$  limits on both lines and lower  $SO_2$  limits on Line 2 than the MPCA's baseline BART proposal. This, combined with the total annual emissions decrease, leads the MPCA to determine the following limits are BART for United Taconite.

Unit	BART NO <sub>x</sub> Limit	BART SO₂ limit
	(tons per day, 30-day rolling average)	(tons, 30-day rolling sum)
Line 1 (EU040)	4.5	106.3
Line 2 (EU042)	10.1	197

The limit for Line 2 applies to emissions from both stacks. Compliance will be determined through the use of CEMS.

<sup>&</sup>lt;sup>3</sup> Estimates of emissions from the unlimited and MPCA proposals were done using the maximum furnace throughput and assuming 8760 hours of operation annually. The unlimited emissions also include the baseline

 $<sup>^4</sup>$  Because the facility does not have NO<sub>X</sub> emission limits, the unlimited emissions for NO<sub>X</sub> were estimated using baseline actuals from the August 2010 permitting action. Line 1 SO<sub>2</sub> unlimited emissions were estimated the same way, while Line 2 SO<sub>2</sub> unlimited emissions were estimated using the statewide 4.0 lbs/MMBtu emission limit, which is higher than the baseline actuals of 3652 tpy.

Figure Content   Figure   Fi	Furnace Capacity Proposed Operations (From 8/10 Permit) Past Emissions Estimate - [1 on Natural Gas - Full NOX	280 tons pellets/hour. 250 tons pellets/hour	190	MMBtu/hr	2,452,800	ons pellets/year	Ш
MARRENT   196   1,550,000	Proposed Operations (From 8/10 Permit) Past Emissions Estimate - L1 on Natural Gas - Full NOX		0.61	KANADA, AT AND L.			
Particle	Past Emissions Estimate - L1 on Natural Gas - Full NOX		1	MIMBTU/LI pellets	1,950,000	tons pellets/year	
13   13   13   13   14   15   15   15   15   15   15   15	NOX	Erroaco Canaday	100/04	The Aless			
Missions Estimate - Li on Notural Gas - Proposed Operations   86.54   206.58   10.0   28.7		3.5639/lbs/long tons nellet	997.892	73949 41	11 07	tons per year	Erthmated union baseding Actuals from 0.140 account
The filter control of the control	502	0.0308 lbs/long tons nellet	8 624	206 98	010	43/1	Committed using baseline Actuals from 6/10 permit
The colored Control Color Series   1,559   Baylong tons pellet   7,7   154,80   1,059   3475   3475   154,80   1,059   3475   3475   345,80   1,059   3475   345,80   1,059   3475   345,80   1,059   3475   345,80   1,059   3475   345,80   1,059   3475   345,80   1,059   3475   345,80   1,059   3475   345,80   1,059   3475					2	5	Carmated using pasefule Actuals from 67 to permit
3.659  Baylong tons pellet   800.975   71383.40   116.99   34.75   316.80   32.75   316.80   32.75   316.80   32.75   316.80   32.75   316.80   32.75   316.80   32.75   316.80   32.75   32.80   32.75   32.80   32.75   32.80   32	Past Emissions Estimate - L1 on Natural Gas - Pro	posed Operations					
10   10   10   10   10   10   10   10	NOX	3.5639 lbs/long tons pellet	890.975	21383.40	10.69	3475	
The colored Chemister Capacity   18718   449232   2.25   R20	502	0.0308 lbs/long tons pellet	7.7	184.80	0.09	30	
18   18   18   18   18   18   18   18	Dobbartial Emissions Entire ate 14 on Falla Frala						
Listensions Estimate - L1 on Solid Fuels - Proposed Operations         1675 Jan.         4445.33 / 2.25 / 3229         820           List Emissions Estimate - L1 on Solid Fuels - Proposed Operations         4.0 lbs/MMBtu         760         18240.00         2.01         652           Limit - L1 on Matural Gas - Full Furnace Capacity         0.5128 lbs/long tons pellet         16.10.83         2.4439.2         12.22         4.460           Limit - Froposed Operations         0.5121 lbs/long tons pellet         33.88         813.12         0.41         14.48           Limit - Froposed Limit - Full Furnace Capacity         0.5121 lbs/long tons pellet         33.88         813.12         0.41         11.8           Copacitions         1.016.3 lbs/long tons pellet         33.88         813.12         0.41         11.8           Copacitions         1.016.3 lbs/long tons pellet         33.88         813.12         0.41         11.8           Copacitions         1.05 lbs/long tons pellets / flour         40.05 lbs/long tons pellets / flour         40.05 lbs/long tons pellets / flour         40.05 lbs/long tons pellets / flour         10.52 lbs/long tons pellets / flour </td <td>NOW</td> <td>ruii Furnace Capacity</td> <td></td> <td></td> <td></td> <td></td> <td></td>	NOW	ruii Furnace Capacity					
A 0   Inst./MM8tu   766   18240.00   9.12   3.29	NOX	0.6685 lbs/long tons pellet	187.18	4492.32	2.25	820	Baseline Actual emission factor from Line 2
Limit - Froposed Operations   167 125   167	202	4.0 lbs/MMBtu	760	18240.00	9.12	3329	Using statewide 4.0 emission factor
16.665   lay/long tons pellet   167.125   4011.00   2.01   652	Potential Emissions Estimate - L1 on Solid Fuels -	Proposed Operations					
10   14640.00   7.32   2379	NOX	0.6685 lbs/long tons pellet	167.125	4011.00	2 01	657	Raceline Actuals emission factor for tipe 3
Limit - L1 on Natural Gas - Full Furnace Capacity         Limit - L1 on Natural Gas - Full Furnace Capacity         1018.3 lbs/hour         1018.3 l	502		610	14640.00	7.32	2379	Using statewide 4.0 emission factor
1018.3   Bs/fnoyr   1018.3   Bs/fnoyr   1018.3   24439.7   12.22   4460	MPCA Limit - L1 on Natural Gas - Full Furnace Car	nacity					
10.12.1   Ibs/long tons pellet   33.88   813.12   0.41   148	NOX	1018.3	1018.3	2 95442	12.22	4460	
Unit - Proposed Operations   1018.3   Its/hour   Its/h	502		33.88	813.12	0.41	148	
Imit - Proposed Operations   10.121   Ibs/hour tons pellet   10.121   Ibs/hour tons pellet   118   1							
1018.3   lbs/hour   1018.4   lbs/hour   1018	MPCA Limit - Proposed Operations						
Coposed Limit - Full Furnace Capacity   816   Const/180 days   A153   A155	NOX	1018.3 lbs/hour				3971	7800 hours of operation annually
1000sed Limit - Full Furnace Capacity   81.6 tons/180 days   4.53   1655   1655   1665   1001,	502					118	
1.7   Ibs/MMBtu   1.7   Ibs/MBtu   Ibs/MBtu   1.7   Ibs/MBtu	Har Dronoced Limit - Eul Europe Capacita						
106.3 tons/30 days   32.3   775.2   3.84   1.29.3   1.20.3   1.2	NOX					i i	
Capacity	502				4,33	1003	
e Capacity         672 tons pellets/hour         400 MMBtu/hr         C 2,106,000 MMBtu/hr           ed Operations         4,050,000 tons pellets/year         0.52 MMBtu/lT         2,106,000 MMBtu/year           missions Estimate - Full Furnace Capacity         0.6685 lbs/long tons pellets         449,232         10781.568         5.39         1968           missions Estimate - Proposed Operations         0.6685 lbs/long tons pellets         449,232         10781.568         5.39         1968           missions Estimate - Proposed Operations         0.6685 lbs/long tons pellets         449,232         10781.568         5.39         1354           Umit - Full Furnace Capacity         753.8 lbs/hour         753.8 lbs/hour         680.0         1630.0         8.16         2978           Limit - Proposed Operations         753.8 lbs/hour         753.8 lbs/hour         2271			123	7757	3 88	1715	The state of the s
Page					3	CTET	ישוויים בפורתומנוסון, סמצפת כון המצפונום אכל פאגו זמן ד
State   Capacity   G72 tons pellets/hour   A00 MM8tu/hr   2,106,000 MM8tu/year   G 52 MM8tu/LT   G 54 MM8tu/LT   G 64 MM8tu	Line 2						
Osed Operations         4,050,000 tons pellets/year         6 0.52 MMBtu/LT         2,106,000 MMBtu/year           Emissions Estimate - Full Furnace Capacity         0.6688 lbs/long tons pellets         449,232         10781.568         5.39         1968           Emissions Estimate - Proposed Operations         0.6688 lbs/long tons pellets         460,000 MMBtu         15.20         7008           Emissions Estimate - Proposed Operations         0.6688 lbs/long tons pellets         1,500         195.20         7008           A Limit - Full Furnace Capacity         753.8 lbs/hour         753.8 lbs/hour         1,700         1,700         1,700           A Limit - Proposed Operations         753.8 lbs/hour         1,700         1,700         1,700         1,700           A Limit - Proposed Operations         753.8 lbs/hour         1,700         1,700         1,700         1,700	Furnace Capacity		400	MMBtu/hr			
Emissions Estimate - Full Furnace Capacity         Los Ge85   Ibs/long tons pellets         Hos/hour         Ibs/hour         Ibs/hour         Ibs/hour         Los Ge85   Ibs/long tons pellets         Los Ge85   Ibs/long tons pellets         Los Ge85   Ibs/long tons pellets         Los Ge95   Ibs/hour         Los Ge95   Ibs/hour         Los Ge95   Ibs/hour         Ibs/	Proposed Operations		0.52	MMBtu/LT	2,106,000	MMBtu/year	
Emissions Estimate - Proposed Operations         0.6685 lbs/long tons pellets         449,232         10781.568         5.39         1968           Emissions Estimate - Proposed Operations         0.6685 lbs/long tons pellets         1354         1354         1354           A Limit - Full Furnace Capacity         753.8 lbs/hour         753.8 lbs/hour         753.8 lbs/hour         8.16         2978           A Limit - Proposed Operations         753.8 lbs/hour         753.8 lbs/hour         2271           1.7 lbs/MM8tu         680.0         16320         8.16         2978           1.7 lbs/MM8tu         680.0         16320         8.16         2978           1.7 lbs/MM8tu         1805.0         15320         8.16         2978	Past Emissions Estimate - Full Furnace Capacity		lbs/hour	/bs/day	tons ner day	tons ner vear	
Emissions Estimate - Proposed Operations         4.0 lbs/MMBtu         1600         38400         19.20         7008           Emissions Estimate - Proposed Operations         0.6685 lbs/long tons pellets         1354         1354           A Limit - Full Furnace Capacity         753.8 lbs/hour         753.8 lbs/hour         753.8 lbs/hour         8.16         2978           A Limit - Proposed Operations         753.8 lbs/hour         753.8 lbs/hour         2271         2271           A Limit - Proposed Operations         753.8 lbs/hour         2271         2271	NOX		449.232	10781.568	5.39	1968	Estimated using baseline Actuals from Jast Dermit
Emissions Estimate - Proposed Operations       0.6685 lbs/long tons pellets       1354         4.0 lbs/MMBtu       4.0 lbs/MMBtu       4212         4 Limit - Full Furnace Capacity       753.8 lbs/hour       753.8 lbs/hour       8.16       2978         4 Limit - Proposed Operations       753.8 lbs/hour       1.7 lbs/hour       2271         1.7 lbs/MMBtu       680.0       16320       8.16       2978         2071       1.7 lbs/hour       753.8 lbs/hour       2271	502		1600	38400	19.20	7008	Using 4.0 emission factor: baseline actuals were 3652
Emissions Estimate - Proposed Operations         0.6683   bs/long tons pellets         1354           4.0   bs/MMBtu         4.0   bs/MMBtu         42.12           4 Limit - Froposed Operations         753.8   bs/hour         753.8   bs/hour         80.0   16320   8.16   2978           4 Limit - Proposed Operations         753.8   bs/hour         227.1           1.7   bs/MMBtu         80.0   15320   8.16   2978           1.7   bs/MMBtu         80.0   15320   8.16   2978			-				
A Limit - Proposed Operations         1.753.8 lbs/hour         1.75	Past Emissions Estimate - Proposed Operations						
4.0 lbs/MMBtu       4.212         4.12       4.212         4.22       4.22         4.23       4.22         4.24       4.22         4.25       4.22         4.23       4.23         4.24       4.22         4.25       4.22         4.25       4.22         5.27       5.27         4.17       1.2 lbs/MMBtu         1.7 lbs/MMBtu       1.7 lbs/MMBtu	NOX					1354	Estimated using baseline Actuals from Last Permit
A Limit - Proposed Operations       753.8 lbs/hour       753.8 lbs/hour       753.8 lbs/hour       3302         A Limit - Proposed Operations       753.8 lbs/hour       2271         1.7 lbs/MM8tu       1790	502					4212	Using 4.0 emission factor; baseline actuals were 3652
A Limit - Proposed Operations 753.8 lbs/hour 753.8 lbs/hour 753.8 lbs/hour 753.8 lbs/hour 753.8 lbs/hour 753.8 lbs/hour 1.7 lbs/MM8tu 1.7 lbs/	MPCA Limit - Full Eurnace Canacity						
A Limit - Proposed Operations 753.8 lbs/MM8tu (88.0 16320 8.16 2978 2778 2783.8 lbs/hour 2271 2779 2779 2779 2779 2779 2779 2771 2771	NOX		357	000	L		
4 Limit - Proposed Operations 753.8 lbs/hour 2271  1.7 lbs/MM8tu 12930 8.16 2978			733.8	7,16081.2	9.05	3302	
A Limit - Proposed Operations         753.8 lbs/hour         2271           1.7 lbs/MM8tu         1790	2002		680.0	16320	8.16	2978	
753.8 lbs/hour 2271 1.7 lbs/MM8tu 1790	MPCA Limit - Proposed Operations					-	
1.7 lbs/MM8tu 1790	XON						
T. / IOS/ WINDLU	SOS					2271	6027 hours of operation annually
	305					1790	

Utac Proposed Limit				tons per day	ay tons per year			
NON	1820	tons/180 days		10.11	3692			
s02	197	tons/30 day		6.57	2394			
							_	
Reported Actual Emissions from UTac	2007	2008	5009					
NOX	4263	3540	1968					
502	3654	3726	2936	!				
Total Emissions - Full Furnace Capacity	XON	205						
Past and Unmodified	6338	7046						
MPCA BART	7762							
MPCA - Past	1423	6161	-2496					
Utac BART	5347							
Utac BART - Past	-991	-3359	-4350					
Utac BART - MPCA	-2415	2) 290	-1855					
							-	
Total Emissions - Proposed Operations	XON	202						
Past and Unmodified	4829	4242	-	Using baseline actuals and proposed future annual throughput	osed future annual thro	ghput.		
MPCA BART	6243	1908	_	Using proposed annual throughput.	out.(			
MPCA - Past	1414	1 -2334	-920			- 1		
Utac BART	5347	7898						
Utac BART - Past	518	3 -555	-37		-			
Utac BART - MPCA	968-	5 1779	883					
ממכים שוו כיי								Ł

SF-00006-05 (4/86)

DEPARTMENT: POLLUTION CONTROL AGENCY

STATE OF MINNESOTA
Office Memorandum

DATE: October 7, 2011

TO: AQD File No. 62B

(Delta ID No. 13700063)

FROM: Hongming Jiang

Catherine Neuschler

Air Quality Permits Section

**Industrial Division** 

Air Assessment and Environmental Data Management Section

**Environmental Analysis and Outcomes Division** 

PHONE: 651-757-2467

651-757-2607

SUBJECT:

Nitrogen Oxides BART Limits for U.S. Steel – Keewatin Taconite (Keetac)

This memo was prepared to provide the documentation of the MPCA's  $NO_X$  and  $SO_2$  BART limit determination based on the technical review performed by MPCA staff. EPA's approval of the Regional Haze State Implementation Plan (SIP) for Minnesota is needed for the MPCA's BART determination to become effective.

#### 1. General Information

#### 1.1 Applicant and Stationary Source Location:

Applicant/Mailing Address	Stationary Source (SIC: 1011)/Address	
U.S. Steel – Keewatin Taconite	1 Mine Road	
P.O. Box 217 Keewatin, Minnesota 55753		
Keewatin, MN 55753-0217 St. Louis County		
Contact: Mr. Ryan S	iats; Phone (218) 778-8684	

#### 1.2 Description of the Facility

U.S. Steel owns and operates a taconite mine and processing facility in Keewatin, Minnesota, known as Keetac. At Keetac, U.S. Steel operates one grate-kiln furnace (the "Phase II furnace;" EU030) constructed in 1976. The furnace is capable of processing 415 tons of pellets per hour with a heat input of 178.5 MMBtu/hr.

The permit for the Keetac facility allows the combustion of natural gas, distillate fuel oils, coal, and petroleum coke in the pelletizing furnace. Coal and natural gas are the primary fuels; coal is a significant source of sulfur. Another source of sulfur emissions from this furnace is the iron ore used to form the green balls, although this represents a smaller contribution than the sulfur in the solid fuels burned. Sulfur dioxide emissions are currently controlled by wet scrubbers.

### 2. Regulatory and/or Statutory Basis

## 2.1 Overview of Visibility, Regional Haze, and Best Available Retrofit Technology Program

The U.S. EPA's 1999 Regional Haze Rule singles out certain older emission sources that have not been regulated under other provisions of the Clean Air Act for additional controls. The MPCA is required to determine Best Available Retrofit Technology (BART) for these older sources that contribute to visibility impairment in Class I Areas to install Best Available Retrofit Technology (BART). On July 6, 2005, U.S. EPA published a revised final rule, including 40 CFR 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which older sources may need to install BART and for determining BART.

The MPCA is required to determine BART for each source subject to BART based on an analysis of the best system of continuous emission control technology available and associated achievable emission limits. The analysis must take into Draft

December 2011

consideration the technology available, the costs of compliance, the energy and non-air quality environmental impacts, any pollution control equipment in use at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from use of the technology.

Further discussion of the regulatory basis for this determination can be found in the MPCA's December 2009 Regional Haze State Implementation Plan submittal, in Appendix 9.3.

## 2.2 Affected Units

The units for which the MPCA must determine BART and establish emission limits consistent with that determination are:

Emission Unit Name	EU Number <sup>1</sup>	Control Equipment and Stack Numbers
Phase II Grate-Kiln Pelletizing	EU030	CE110, CE111/SV051
Furnace		

## 2.3 The BART Determination

The MPCA's BART determinations for this unit is documented in Appendix 9.3 of the December 2009 Regional Haze SIP submittal.

The  $NO_X$  BART determination for the Phase II furnace is existing combustion controls and fuel blending, along with good combustion practices.

However, due to the lack of sufficient emissions data representing the range of operating conditions that influence emissions, the MPCA did not set an emission limit at the time of making the BART determination for the indurating furnaces. Instead, the MPCA and Keetac entered into an Administrative Order, under which Keetac agreed to install and maintain Continuous Emissions Monitoring Systems (CEMS) and provide  $NO_X$  emission information to the MPCA.

The  $SO_2$  BART determination is operation of the existing wet scrubber. However, as with  $NO_X$ , additional emission information was needed prior to setting an  $SO_2$  limit from this primarily coal-fired furnace. Keetac agreed in an Administrative Order to install and maintain  $SO_2$  CEMS and provide emission information to the MPCA.

### 2.4 MPCA Determination of the BART Limit

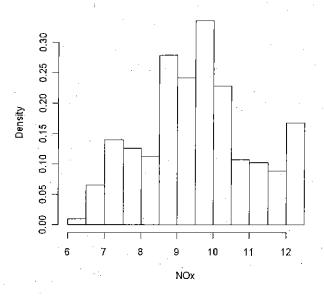
The MPCA reviewed the NO<sub>X</sub> and SO<sub>2</sub> emission information provided by Keetac.

 $NO_X$  emission data was received going back to November 2008, but the Keetac facility was shut down for a year from early December 2008 through late December 2009. (Only a few days of operating data were received for December 2009.) Therefore, the MPCA's review focused on the most recent data after Keetac's return to operations in December 2009. Data from late January 2010 through the end of March 2011 was analyzed to develop the BART limits.

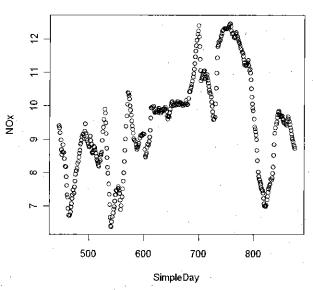
The following graphs show the variation in emissions over the analyzed time frame, along with the frequency of measurements of each emission level.

The MPCA organizes conditions and illustrates associations in its permits using the Emission Unit (EU), Control Equipment (CE), and Stack/Vent (SV) numbers.

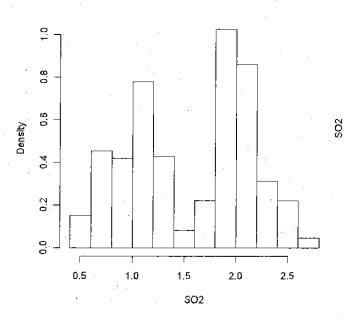
# Frequency of NO<sub>x</sub> Emissions (tpd)



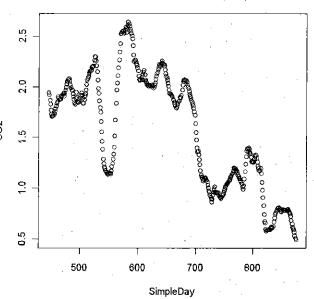
# NO<sub>x</sub> Emissions Over Time (tpd)



Frequency of SO<sub>2</sub> Emissions (tpd)



SO<sub>2</sub> Emissions Over Time (tpd)



The following table shows descriptive statistics of the  $NO_X$  and  $SO_2$  emissions from the furnace, in tons per day.

	ssions Descriptive :	
	Furnace NO <sub>x</sub>	Furnace SO <sub>2</sub>
# Data Points	429	429
Minimum	6.390	0.4953
Mean	9.535	. 1.569
Median	9.587	1.789
Maximum	12.476	2.639

The most recent data was plotted to the most appropriate statistical probability distribution, and a 98% confidence interval was constructed. The limit was based on the upper confidence level.

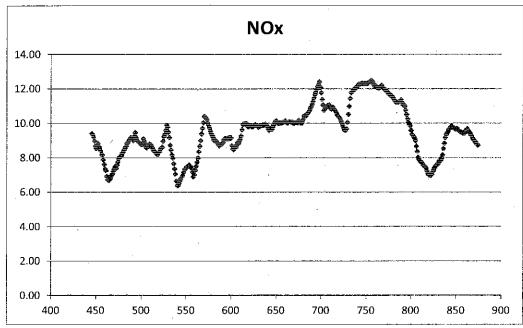
A reviewing the CEMS data provided by Keetac, the MPCA has determined that the appropriate BART limits are those shown in the following table.

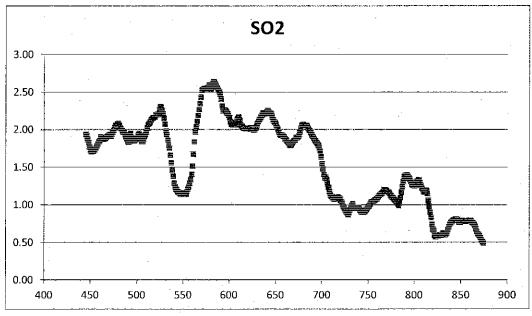
Ke	etac BART Limits			
(30 day rolli	ng average, tons p	er day)		
	Furnace NO <sub>X</sub> Furnace SO <sub>2</sub>			
BART Limit	12.35	2.71		

These limits are 30-day rolling averages. Compliance is to be determined through the continued use of CEMS.

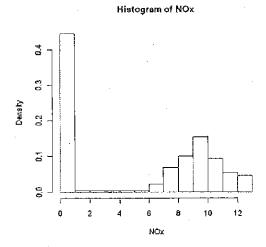
# Proposed Keetac BART Limits (ton/day) calculated as a 30-day rolling average

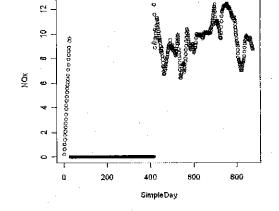
hase 2 pelletizer	NOx	SO2	
Proposed limit	12.35	2.71	ton/day
Pattern; %-tile	Weibull; 98	Weibull; 98	based on the data of recent rows (1/26/2010-3/31/2011)
c.f. Max	12.48	2.64	based on the data of recent rows
	1040	220	uniform emission rate, lb/hr
Limit/Max	99%	103%	
	1029	225.8	uniform limit, lb/hr
	1032	240	gap filling value permittee used in submittal



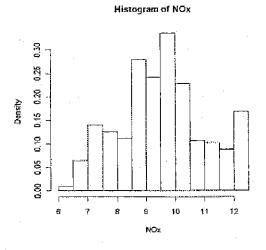


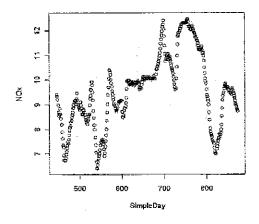
# All rows of data:



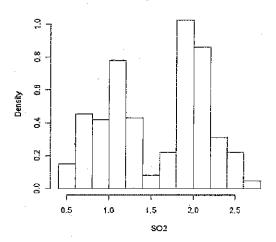


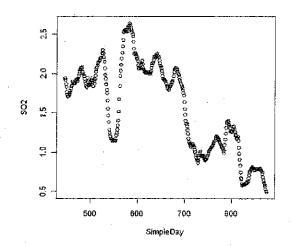
# Recent rows (1/26/2010-3/31/2011)





#### Histogram of SO2





### Commands entered at R Console (7/29/2011)

R 2.1.3.0 R for Windows GUI front-end

 $> data frame < -read.csv("C:\Documents and Settings\hjiang\Desktop\Data_R.csv", header=T)$ 

> names(dataframe)

[1] "SimpleDay" "NOx"

> attach(dataframe)

> summary(dataframe)

SimpleDay NOx

Min.: 0 Min.: 0.000 1st Qu.: 218.5 1st Qu.: 0.000

Median: 437.0 Median: 7.257

Mean : 437.0 Mean : 5.192

3rd Qu.: 655.5 3rd Qu.: 9.699

Max.: 874 Max.:12.476

> hist(NOx,prob=T)

SimpleDay NOx SO2

Min.: 445 Min.: 6.390 Min.: 0.4953

1st Qu.: 552.2 1st Qu.: 8.595 1st Qu.: 1.0800

Median:659.5 Median: 9.587 Median:1.7890 Mean: 659.5 Mean: 9.535 Mean:1.5694

3rd Qu.: 766.8 3rd Qu.: 10.341 3rd Qu.: 2.0234

Max. : 874 Max. : 12.476 Max. : 2.6393

> hist(NOx,prob=T)

> hist(SO2,prob=T)

> plot(SimpleDay,NOx)

<b>Keetac Phase</b>	II NOx <u>30-d</u>	ay rolling average	, ton/day	,, as submitted
Date	SimpleDay	NOx	SO2	_
11/7/08	0	0.20	0.031	•
11/8/08	1	0.61	0.077	
11/9/08	2	1.02	0.113	
11/10/08	3	1.41	0.157	
11/11/08	4	1.76	0.202	
11/12/08	5	2.06	0.265	
11/13/08	6	2.40	0.330	
11/14/08	7	2.72	0.394	
11/15/08	8	3.07	0.446	
11/16/08	. 9	3.44	0.499	
11/17/08	10	3.88	0.553	
11/18/08	11	4.21	0.597	
11/19/08	12	4.55	0.625	
11/20/08	13	4.87	0.665	
11/21/08	14	5.25	0.708	
11/22/08	15	5.54	0.751	
11/23/08	16	5.83	0.793	
11/24/08	17	6.05	0.833	
11/25/08	18	6.33	0.872	
11/26/08	19	6.66	0.892	
11/27/08	20	7.08	0.940	
11/28/08	21	7.50	1.007	
11/29/08	22	7.91	1.059	
11/30/08	23	8.28	1.078	
12/1/08	24	8.62	1.114	•
12/1/08	25	8.90	1.149	
12/2/08	25 26	9.40	1.171	•
12/4/08	27	9.62	1.177	
12/5/08	28	0.00	0.000	
No data until			Strategic and the second	Blank was submitted.
12/28/09	416	9.29		Not calc'd in the submittal
12/28/09	417	12.38	D.000	Not calc a in the submittal
12/23/03	418	12.38	0.000	
12/30/09	419	12.38	-0.000	
1/1/10	420	11.56	2.71	-
1/2/10	421	10.32	2.70	
1/2/10	421	8.85	2.66	
1/3/10	423	9.57	2.58	
1/5/10	424	9.20	2.51	4
1/6/10	425	9.70	2.49	
1/7/10	425	10.05	2.43	
1/8/10		9.84	2.34	
1/8/10	427	10.25	2.30	
1/10/10	428	10.70	2.23	
1/10/10	423	10.70		
		11 15	7 10	
	430	11.16	2.18	
1/12/10	430 431	11.29	2.10	•
1/12/10 1/13/10	430 431 432	11.29 11.32	2.10 2.03	
1/12/10 1/13/10 1/14/10	430 431 432 433	11.29 11.32 11.12	2.10 2.03 1.95	
1/12/10 1/13/10 1/14/10 1/15/10	430 431 432 433 434	11.29 11.32 11.12 11.12	2.10 2.03 1.95 1.93	
1/12/10 1/13/10 1/14/10 1/15/10 1/16/10	430 431 432 433 434 435	11.29 11.32 11.12 11.12 10.95	2.10 2.03 1.95 1.93 1.94	
1/12/10 1/13/10 1/14/10 1/15/10 1/16/10 1/17/10	430 431 432 433 434 435 436	11.29 11.32 11.12 11.12 10.95 10.74	2.10 2.03 1.95 1.93 1.94 1.96	
1/12/10 1/13/10 1/14/10 1/15/10 1/16/10	430 431 432 433 434 435	11.29 11.32 11.12 11.12 10.95	2.10 2.03 1.95 1.93 1.94	

1/20/10	439	10.18	1.97
1/21/10		10.02	1.96
1/22/10	441	9.85	1.94
1/23/10	442	9.71	1.93
1/24/10	443	9.60	1.93
1/25/10	444	9,51	1.93
1/26/10	445	9.41	1.94
1/27/10	446	9.34	1.92
1/28/10	AND THE PROPERTY OF THE PARTY O	9.20	1.87
1/29/10	Contraction of the Contraction of Contraction of the	8.97	1.83
1/30/10	high additional and an area.	8 69	1.77
1/31/10	A Company and and the series but they are	8.54	1,73
2/1/10	والمراجع والم والمراجع والمراجع والمراجع والمراجع والمراجع والمراجع والمراج	8.61	1171
2/2/10	452	8.83	1.71
2/3/10	453	8.59	1.72
2/4/10	454	8.59	1.74
2/5/10	the state of the state of the last	8.42	1.73
2/6/10	। विद्यानीय विद्यानी	819	1.76
2/7/10		8.17	178
2/7/10	457 458	7.88	1,81
	deed and proper to Consider to		Them to be with his land land
2/9/10	459	7.61	1.84
2/10/10	460	734	1.85
2/11/10	461	7.26	1.90
2/12/10	462	6.92	1.89
2/13/10	463	6.73	1.87
2/14/10	464	6.70	1.87
2/15/10	and the proof of the state of t	6.73	1.88
2/16/10		6.82	1.88
2/17/10	plant of the interest appears a period	6.98	1.90
2/18/10	468	7.06	1.91
2/19/10	469	7.21	192
2/20/10	470	7.34	1.93
2/21/10	471	7.48	1.94
2/22/10	472	7.39	1.90
2/23/10	473	7.57	1.94
2/24/10	474	7.75	197
2/25/10	475	7.95	1.99
2/26/10	476 477 478	8.06	2.03
2/27/10		8.05	2.05
2/28/10		8:12	2.05
3/1/10	479	8.27	2:07
3/2/10	480	8.34	2.08
3/3/10	481	8.46	2,06
3/4/10		8.58	2.02
	483 484	8.68	2.01
3/6/10		8.84	1.99
3/7/10		8.87	1.97
3/8/10		8.98	1.96
3/9/10		9.08	1.93
3/10/10		9.16	190
3/11/10	465	9.16	1.88
3/12/10		9.11	1.84
3/13/10	491	9.00	1.83
3/14/10	492	9.24	1.88
3/15/10	. 493	9,46	1.94

3/16/10	494		9.18	1.90
3/17/10	<b>495</b>		9.01	1,85
3/18/10	496		8.96	1.85
3/19/10	497		8.90	1.85
3/20/10	498		8.86	1.86
4-	and the second second		8.81	1.88
3/21/10	499		in the special in the	
3/22/10	500		8.78	1.89
3/23/10	501	n propinsione Marithmento	8.77	1.92
3/24/10	502		9.10	1.94
3/25/10	503		8.97	1.92
3/26/10	ii 4504		8.84	1.89
3/27/10	505		8.61	1.84
3/28/10	506		8.59	1.84
3/29/10	507		8.63	1.87
3/30/10	508		8.68	1.91
3/31/10	509		8.79	1.93
4/1/10	510		8.76	1.97
4/2/10	511		8.67	2.02
4/3/10	512		<b>8.58</b> ⋅	₫ 2:07
4/4/10	513		8.48	2.08
4/5/10	514		8.39	2.10
4/6/10	# 515		8.34	2.13
4/7/10	516		8.30	2.14
4/7/10	517		8.22	2.16
4/8/10	September 12 and		8.19	2.16
	518		MALES AND RESERVED	2.16
4/10/10	4519		8.32	
4/11/10	520		8.36	2.20
4/12/10	521		8.52	2.20
4/13/10	522		.8.56	2.20
4/14/10	523		∥8.62	2.21
4/15/10	524		8.96	2.26
4/16/10	525	ngsaas valories Aphastaly iss	9.22	2.30
4/17/10	≣⊪⊪ 526		. 9.36	2.30
4/18/10	527		9.59	-⊫2,26
4/19/10	528		9.90	2.21
4/20/10	= 529		9.79	2.15
4/21/10	530		9.49	2.07
4/22/10	531		9.17	# 1.98
4/23/10	532		8.73	1.93
4/24/10	533		8.45	1,86
4/25/10	PERSONAL PROPERTY AND AND		8.16	1.80
4/26/10	the barrier of the standar	and the	7.99	1.75
4/27/10	536		7.66	1.66
4/28/10	F-14-11-1-11-11-11-11-11-11-11-11-11-11-1		7:35	1.56
4/29/10	test billion to the Land		7.05	<b>1,</b> 46
4/30/10	GALLEY HOLDER		6.66	1.38
5/1/10	The state of the s		6.39	1.29
	Control of the second			1,24
5/2/10			6.39 6.53	1,24
5/3/10	A CHARLES IN COLUMN TO THE			1,21 1,20
5/4/10	Colored the property of the second		6.67	1,ZU
5/5/10			6.79	1.18
5/6/10	Garage Charles Charles Control	相談場的	6.91	1.16
5/7/10			6,99	1.16
5/8/10	belle and a series of the series of the series		7.15	-1.14
5/9/10	548		7,34	1.14

F 14 0 14 0 3		oniasessa.	4000145	erenegarie	HISTORY TO THE
5/10/10	And Michiganianak		5514651545	34	PERSONAL PROPERTY
5/11/10	. 550		election design	46 🕌	1:16
5/12/10	. E 551.		1112011011	46	1,15
5/13/10	552		to the policy does	52	1.15
5/14/10	553	mulioum in	en erreit eine er er er er	59	1.14
5/15/10	554			5 <b>3</b>	1.17
5/16/10	555		7.	46	1.21
5/17/10	556		7.	39	1.24
5/18/10	557		7.	17	1.29
5/19/10	558		<b>⊟</b> 6.9	90	1.33
5/20/10	559		7.1		1 40
5/21/10	560		7.		151
5/22/10	561		17.		1.67
5/23/10	562		7.		1.84
5/24/10	563		Section 15 to	99	197
5/25/10	564		8.	relyacionolatadam:	2.04
1221	The state of the s		with a little and a least transfer	mino like like has	ristrikativ sabiska .
5/26/10	565		8.6		2.11
5/27/10	566		9.(		2.19
5/28/10	567		. [9]	energy of Paint and In	2.26
5/29/10	568		9.	abbathan a baile	2.34
5/30/10	569		10.0	11.0	2.43
5/31/10	570		10.2		2.52
6/1/10	571		10.	37	2.53
6/2/10	ii 572⊹		_10.	31	2.54
6/3/10	573		10.2	1	2.55
6/4/10	574		10.0	1	2.55
6/5/10	575		9.8	8	2.53
6/6/10	576		9.,	73: ::::::	2.53
6/7/10	577		9.5		2.56
6/8/10	578		9.2	1911	2.59
6/9/10	579		9.		2.58
6/10/10	580		9.2	etherologists:	2.54
6/11/10	581		9.0	the state of the s	2.57
6/12/10	582	130 B	8.9	in the contract of the contrac	2.61
6/13/10	583		8.9	and the state of the state of the state of	2.64
	character beauty beauty			managed a balling boat grants.	【大的情况】【表示。据此是实现在
6/14/10	584		8.9		2.62
6/15/10	585		8.8	spelvickiers as	2.60
6/16/10	586		8.7		2.58
6/17/10	- 58 <b>7</b>		8.7		2.56
6/18/10	588		i 8.7		ii 2,53
6/19/10	589		8.7	The tip Control of the	2.51
6/20/10	- 590		8.8	SEASON DON'T BE	2.47
6/21/10	591		8.8	2,33,12,33,31,33	2.41
6/22/10	592		9.0	4 📖	2.31
6/23/10	593		9.1	1	2.25
6/24/10	594		9.1	3	2.26
6/25/10	595		- 9.0	9	2.26
6/26/10	596		9.1	2	2.25
6/27/10	597		9.1		2.23
6/28/10	598		9.1		2.21
6/29/10	599		9.1		2 19
6/30/10	600		9.1	amine the Lart names	2.16
7/1/10	601		8.7		2.11
7/2/10	602		8.5		2.07
7/2/10	603		8.4	STEE 31151 ST.	4 1 1 2 1 1 2 1 1 2 1 2 1 2 1 2 1 2 1 2
// 3/ 10 號	נטס		11104		2.06

7/4/10	604		8.56	2.07
7/4/10		de pantos	8.60	2.09
7/5/10	605		8.76	2.03 2.07
7/6/10	606		8.86	2.07
7/7/10	607		A CALL AND A SECURITION OF THE	2.13
7/8/10	608		8.82	
7/9/10	609		8.93	2.14
7/10/10	A SHAN ASSESSMENT TO MADE.		9.07	2.17
7/11/10	611		9.27	2.12
7/12/10	612		9.64	2.07
7/13/10	613		9.95	2.05
7/14/10	614		9.94	2.04
7/15/10	615		9.97	2.02
7/16/10	- 616		9.99	2.02
7/17/10	617		9.99	2.01
7/18/10	618		9.86	2.02.
7/19/10	619		9.80	2.01
7/20/10	620		9.82	2.01
7/21/10	621		9.88	2.01
7/22/10	622		9.82	2.02
7/23/10	- ⊺623		9.82	2.02
7/24/10	iiii 624.		9.80	2.01
7/25/10	625		9.87	2.01
7/26/10	626		9.93	1.99
7/27/10	627		9.91	⊒2,00
7/28/10	628		9.87	
7/29/10	629		9.85	2.04
7/30/10	630		9.79	2.08
7/31/10	631		<b>₽9.83</b>	2.11
8/1/10	∃ + <b>632</b> :		9:82	2.13
8/2/10	633		9.87	2.15
8/3/10	634		9.88	2.17
8/4/10	635,		9.92	2.19
8/5/10	636		9.88	2.22
8/6/10	637		9.92	2.21
8/7/10	638		9.96	2.20
8/8/10	639		9.90	2.22
8/9/10	640		9.82	2.23
8/10/10	641		9:69	2.26
8/11/10	642		9.61	2.24
8/12/10	643		9.66	2.23
8/13/10	644		9.70	. i 2.22.
8/14/10	<b>4 645</b>		9.67	2.21
8/15/10	646		9.80	The <b>2.17</b>
8/16/10	647		9.91	2.13
8/17/10	648		10.01	2.10
8/18/10	649		10.11	2.09
8/19/10	650		10.13	2.07
8/20/10	651		10.06	2.04
8/21/10	≡ 4652		10.01	2.01
8/22/10			10.01	1.97
8/23/10	654		. 10:02	1.94
8/24/10			10.05	1.93
8/25/10	656		10.02	1.93
8/26/10			10:06	1.92
8/27/10	658		10.06	1.91

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1/9/11	793	10.98	1.39
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3/19/11	862	9.69	0.77
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SF-00006-05 (4/86)

DEPARTMENT: POLLUTION CONTROL AGENCY

STATE OF MINNESOTA
Office Memorandum

DATE: October 26, 2011

TO: AQD File No. 26A

(Delta ID No. 13700005)

FROM: Hong

Hongming Jiang

Catherine Neuschler

Air Quality Permits Section

Air Assessment and Environmental Data Management Section

Industrial Division Environmental Analysis and Outcomes Division

PHONE:

651-757-2467

651-757-2607

SUBJECT:

Nitrogen Oxides BART Limits for U.S. Steel - Minnesota Ore Operations (Minntac)

This memo was prepared to provide the documentation of the MPCA's  $NO_X$  and  $SO_2$  BART limit determination based on the technical review performed by MPCA staff. EPA's approval of the Regional Haze State Implementation Plan (SIP) for Minnesota is needed for the MPCA's BART determination to become effective.

#### 1. General Information

#### 1.1 Applicant and Stationary Source Location:

Applicant/Mailing Address	Stationary Source (SIC: 1011)/Address		
U.S. Steel Corp. Minnesota Ore Operations	Minntac		
P.O. Box 417	County Highway 102		
Mountain Iron, MN 55768	Mountain Iron; St. Louis County		
Contact: Ms. Chrissy Bartov	ich; Phone (218) 749-7364		

# 1.2 <u>Description of the Facility</u>

U.S. Steel – Minnesota Ore Operations (Minntac) owns and operates a taconite mine and processing facility at County Highway 102, on the Mesabi Range north of the City of Mountain Iron, St. Louis County, Minnesota.

Minntac operates five indurating furnaces (Lines 3, 4, 5, 6, and 7). Line 3 (Step I) began operation in 1967; Lines 4 and 5 (Step II) began operation in 1972; and Lines 6 and 7 (Step III) began operation in 1978. This memorandum describes the MPCA's determination of the  $NO_X$  BART limit for these five lines, along with the  $SO_2$  BART limit for Lines 6 and 7.

## 2. Regulatory and/or Statutory Basis

## 2.1 Overview of Visibility, Regional Haze, and Best Available Retrofit Technology Program

The U.S. EPA's 1999 Regional Haze Rule singles out certain older emission sources that have not been regulated under other provisions of the Clean Air Act for additional controls. The MPCA is required to determine Best Available Retrofit Technology (BART) for these older sources that contribute to visibility impairment in Class I Areas to install Best Available Retrofit Technology (BART). On July 6, 2005, U.S. EPA published a revised final rule, including 40 CFR 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which older sources may need to install BART and for determining BART.

The MPCA is required to determine BART for each source subject to BART based on an analysis of the best system of continuous emission control technology available and associated emission reductions achievable. The analysis must take into consideration the technology available, the costs of compliance, the energy and non-air quality environmental

impacts, any pollution control equipment in use at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from use of the technology.

Further discussion of the regulatory basis for this determination can be found in the MPCA's December 2009 Regional Haze State Implementation Plan submittal, in Appendix 9.3.

#### 2.2 Affected Units

The units for which the MPCA must determine BART and establish emission limits consistent with that determination are:

Emission Unit Name	EU Number <sup>1</sup>	Control Equipment and Stack Numbers
Line 3 Indurating Furnace	EU225	CE146/SV103
Line 4 Indurating Furnace	EU261	CE103/SV118
Line 5 Indurating Furnace	EU282	CE113/SV127
Line 6 Indurating Furnace	EU315	CE126/SV144
Line 7 Indurating Furnace	EU334	CE136/SV151

#### 2.3 The BART Determination

The MPCA's BART determinations for these units are documented in Appendix 9.3 of the December 2009 Regional Haze SIP submittal.

The  $NO_X$  BART determination for the five indurating furnaces is generally good combustion practices. This is coupled with low- $NO_X$  burners in the pre-heat zone and fuel blending for Lines 4, 5, 6, and 7. Low  $NO_X$  burners were installed on Line 6 in 2006, Line 7 in 2008, and Lines 4 and 5 in 2009. Fuel blending on Line 3 is also part of the BART determination for that unit.

However, due to the lack of sufficient emissions data representing the range of operating conditions that influence emissions, the MPCA did not set a  $NO_X$  emission limit at the time of making the BART determination for the indurating furnaces. Instead, the MPCA and Minntac entered into an Administrative Order, under which Minntac agreed to install and maintain Continuous Emissions Monitoring Systems (CEMS) on all five lines and provide  $NO_X$  emission information to the MPCA.

The  $SO_2$  BART determination for the indurating furnaces is operation of existing controls. In the initial Regional Haze SIP, the MPCA set a corresponding  $SO_2$  emission limit for Lines 3, 4, and 5, as these lines are natural gas and biomass fired and the  $SO_2$  emissions come primarily from the ore. However, as with  $NO_X$ , additional emission information was needed prior to setting an  $SO_2$  limit from the coal-fired Lines 6 and 7. Minntac agreed in an Administrative Order to install and maintain  $SO_2$  CEMS on these lines and provide emission information to the MPCA. In addition, Minntac has installed  $SO_2$  CEMS on Lines 3, 4, and 5. After reviewing all the data, at the request of Minntac, the MPCA determined to reevaluate the limits for  $SO_2$  on Line 3, 4, and 5.

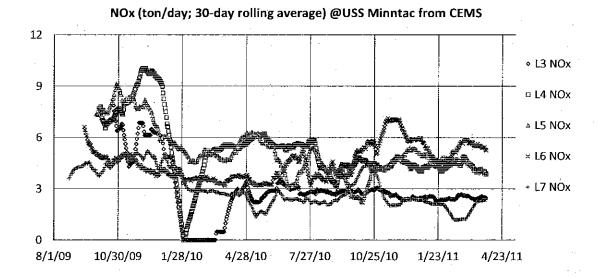
The MPCA organizes conditions and illustrates associations in its permits using the Emission Unit (EU), Control Equipment (CE), and Stack/Vent (SV) numbers.

## 2.4 MPCA Determination of the BART Limit

The MPCA reviewed the NO<sub>x</sub> and SO<sub>2</sub> emission information from all five indurating furnaces provided by Minntac.

 $NO_X$  emission data was received beginning in October 2007 and  $SO_2$  emission data beginning in July 2008. The MPCA's review focused on the most recent data, from the end of August 2009 through the end of March 2011. Each line had a slightly different start date for the data that was analyzed. This difference is due to the high number of zero or very low values for  $NO_X$  emissions recorded through the spring and summer months of 2009. The data to analyze was determined by picking a start date that would allow the calculation of a 30-day rolling average that did not include these large areas of zero values.  $SO_2$  emissions were then looked at over the same time frame.

The following graph shows the variation in NO<sub>x</sub> emissions over the analyzed time frame.

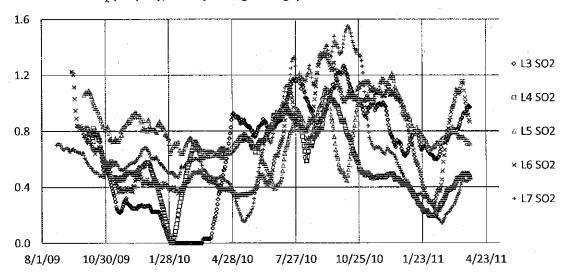


The following table shows descriptive statistics of the NO<sub>x</sub> emissions for each line, in tons per day.

Minntac NO <sub>x</sub> Emissions Descriptive Statistics (30 day rolling average, tons per day)							
	Line 3 NO <sub>x</sub>	Line 4 NO <sub>x</sub>	Line 5 NO <sub>x</sub>	Line 6 NO <sub>x</sub>	Line 7 NO <sub>x</sub>		
# Data Points	526	545	549	566	587		
Minimum	0.000	0.02	2.23	3.18	1.19		
Mean	2.92	5.27	5.20	4.57	3.01		
Std Deviation	1.62	1.82	1.43	1.00	1.08		
Median	2.74	4.78	4.874	4.51	2.70		
Maximum	8.19	10.06	9.136	7.13	5.18		

The following graphs show the variation in SO<sub>2</sub> emissions for all lines over the analyzed time frame.

SO, (ton/day; 30-day rolling average) at USS Minntac from CEMS



The following table shows descriptive statistics of the SO<sub>2</sub> emissions for Lines 6 and 7, in tons per day

Minntac SO <sub>2</sub> Emissions Descriptive Statistics (30 day rolling average, tons per day)						
	Line 3	Line 4	Line 5	Line 6	Line 7	
# Data Points	526	545	549	565	587	
Minimum	0.00	0.00	0.29	0.27	0.14	
Mean	0.66	0.58	0.80	0.70	0.67	
Std Deviation	0.37	0.22	0.17	0.31	0.35	
Median	0.77	0.58	0.77	0.60	0.58	
Maximum	1.27	1.09	1.21	1.36	1.55	

The most recent data for each line and each pollutant was plotted to the most appropriate statistical probability distribution, and a 99% confidence interval was constructed. The limit was based on the 99% upper prediction level.

The MPCA has determined that the appropriate BART NO<sub>x</sub> limits are

Line	NO <sub>x</sub> BART Limit in Tons/Day
3	7.85
4	9.85
5	9.46
6	7.14
7	5.51

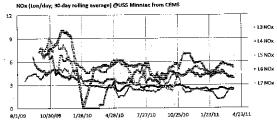
And the appropriate BART SO<sub>2</sub> Limits are:

Line	SO <sub>2</sub> BART Limit in Tons/Day
3	1.28
4	1.10
5	1.10
6	1.47
7	1.61

All of these limits are on a 30-day rolling average basis. Compliance is to be determined through continued operation of the CEMS.

#### Designed BAST Limite: NOv from/day/calculated as a 30-day rolling everyee

	Line 3	Line 4	Line 5	Line 6	line 7		
Data Used	10/29/09 - 3/31/11	10/03/09 - 03/31/11	09/29/09 - 03/31/11	9/12/09 - 03/31/11	08/22/09 - 3/31/11		
NOx Limit	7.85	9.85	9.46	7.14	5.51	tons/day	4
99%-tile of the distribution	3-p Weibuli	Weibull	Lognormal	Gamma	Normal		
c.f. Max	8.19	10,06	9.14	7.13	5.1B	based on the data of recent rows	
Car Hus	6B3	838	761	594	432	uniform emission rate, lb/hr	
Limit/Max	95.6%	97.5%	104%	100%	106%		•
Count	526	545	549	566	597	<del></del>	<del></del>

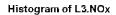


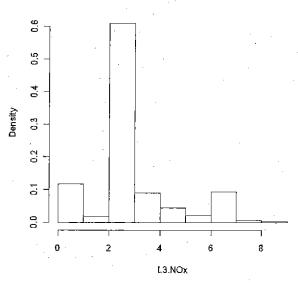
Proposed BART Limits: 902 (Lon/de SO2 Limit 99%-tile of the distribution	y) calculated us a 30-day roll Line 3 1,28 Small Extreme Value	ing everage Line 4 1.10 Normal	Line 5 1,39 Normai	Line 6 1.47 Wejbull	Line 7 1.61 Weibull	tons/day .
ef. Max	1,27 106	1.09	1.21	1.36	1.55 129	based on the data of recent rows unform emission rate, III/IIII
Limft/Max Count	101% 526	101% 545	98% 549	108% _566	104% 	

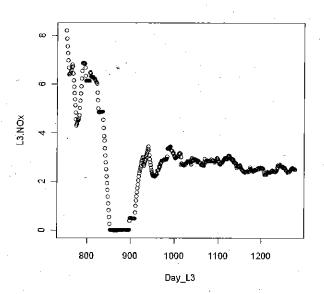


# **Supporting Plots**

# NO<sub>x</sub> Recent Data - L3: 10/22/2009-3/31/2011

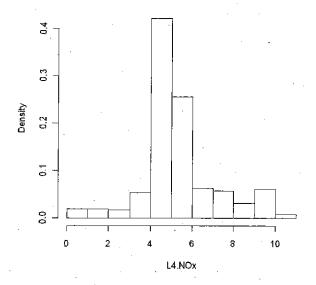


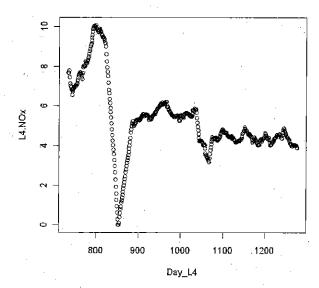




NO<sub>x</sub> Recent Data - L4: 10/3/2009-3/31/2011

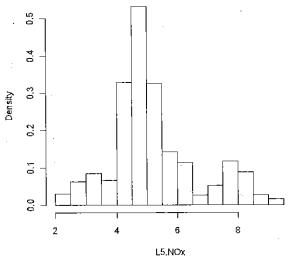
# Histogram of L4.NOx

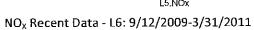




# NO<sub>x</sub> Recent Data - L5: 9/29/2009-3/31/2011

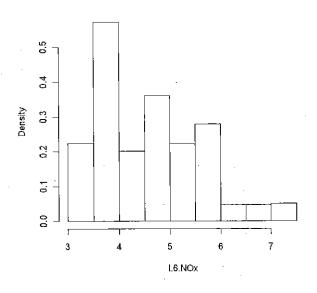
# Histogram of L5.NOx

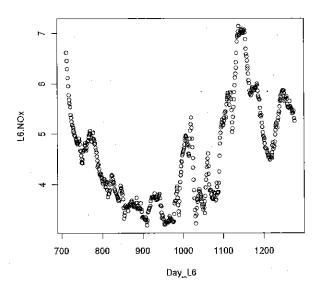




# 800 900 1000 1100 1200 Day\_L5

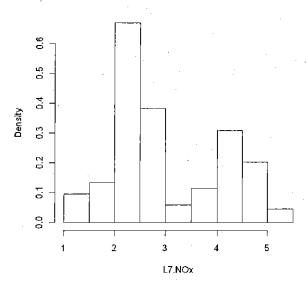
# Histogram of L6.NOx

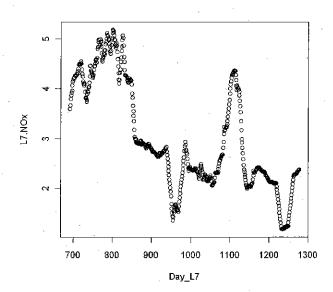




# NO<sub>x</sub> Recent Data - L7: 8/22/2009-3/31/2011

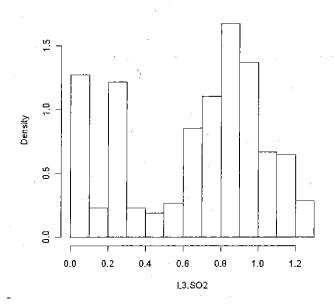
# Histogram of L7.NOx

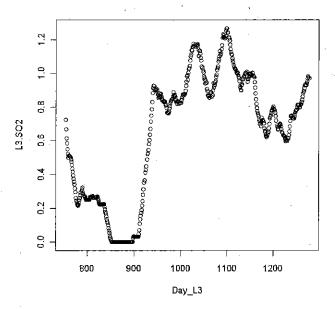




# SO₂ Recent Data – L3

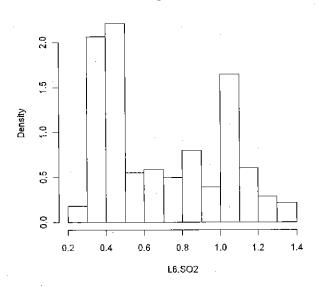
# Histogram of L3.SO2

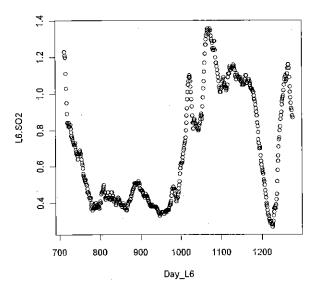




# SO<sub>2</sub> Recent Data - L6

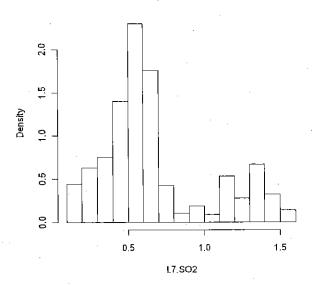
# Histogram of L6.SO2

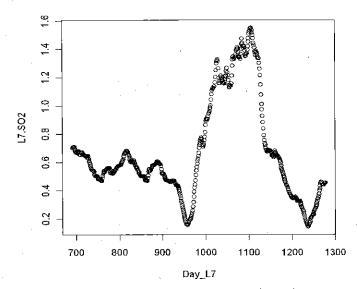




# SO<sub>2</sub> Recent Data – L7

# Histogram of L7.SO2





# **Supporting Derived Values**

```
> dataframe<-read.csv("C:\\Documents and Settings\\hjiang\\Desktop\\Data_R.csv",header=T)
> attach(dataframe)
> names(dataframe)
[1] "Day_L6" "L6.SO2" "Day_L7" "L7.SO2"
> summary(dataframe)
                                 Day_L7
                                                L7.SO2
    Day_L6
                   L6.SO2
Min.: 712 Min.: 0.2700 Min.: 691
                                             Min.: 0.1440
1st Qu.: 53.2 1st Qu.: 0.4200 1st Qu.: 837.5 1st Qu.: 0.4650
Median: 994.5 Median: 0.6000 Median: 984.0 Median: 0.5770
Mean: 994.5 Mean: 0.6967 Mean: 984.0 Mean: 0.6726
3rd Qu.: 1135.8 3rd Qu.: 1.0300 3rd Qu.: 1130.5 3rd Qu.: 0.7300
               Max.: 1.3600 Max.: 1277
                                              Max.: 1.5500
Max.: 1277
               NA's : 21
NA's :
          21
> hist(L6.SO2,prob=T)
> hist(L7.SO2,prob=T)
> plot(Day_L6,L6.SO2)
> plot(Day_L7,L7.SO2)
```

# **Appendix 2: BART Administrative Orders**

# STATE OF MINNESOTA Minnesota Pollution Control Agency

In the Matter of:
ArcelorMittal – Minorca Mine Inc.

ADMINISTRATIVE ORDER

This Administrative Order (Order) is issued by the Minnesota Pollution Control Agency (MPCA) to ArcelorMittal Minorca Mine, Inc (Arcelor) pursuant to Minn. Stat. § 116.07, subd. 9 (2011).

#### **FINDINGS OF FACT**

#### **BACKGROUND**

- On July 6, 2005, the U.S. Environmental Protection Agency (U.S. EPA) published regulations to address visibility impairment in our nation's largest national parks and wilderness ("Class I") areas [70 Fed. Reg. 39103]. This rule is commonly known as the "Regional Haze Rule" [40 CFR §§ 51.300-51.309]. The Regional Haze Rule (Rule) requires that Minnesota establish and achieve visibility goals for each of its mandatory Class I areas by 2018.
- 2. The Rule regulates the emission of pollutants that contribute to regional haze. The MPCA has determined that the key pollutants contributing to regional haze are particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), and nitrogen oxides (NO<sub>X</sub>).
- 3. The Rule requires that Minnesota submit a Regional Haze State Implementation Plan (SIP) to U.S. EPA for its approval. The SIP must include:
  - a. Reasonable Progress Goals Minnesota must establish, for each Class I area within the state, "goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions." [40 CFR § 51.308(d)(1)].
  - b. Long-Term Strategy Minnesota must submit a long-term strategy that addresses regional haze visibility impairment, and includes "measures as necessary to achieve the reasonable progress goals established by States having mandatory Class | Federal areas." [40 CFR § 51.308(d)(3)].
  - c. Best Available Retrofit Technology The Rule regulates certain stationary sources that could contribute to visibility impairment in Class I areas. States, including Minnesota, must determine what constitutes the best available retrofit technology (BART) to control for PM, SO<sub>2</sub>, and NO<sub>X</sub> and to establish emissions limits that are consistent with BART for these sources. The limits must be included in the SIP for U.S. EPA approval.
- 4. The MPCA submitted a Regional Haze SIP to U.S. EPA on December 30, 2009, which included the required Reasonable Progress Goals and Long-Term Strategy and identified the BART-eligible and subject-to-BART sources, listed the MPCA's BART determinations, and included associated BART emission limits where MPCA had sufficient emissions data to set such limits. On April 1, 2010, U.S. EPA notified the MPCA that the submittal was complete.
- 5. Subsequently, MPCA prepared a supplemental SIP submittal that revised the long-term strategy and included BART emission limits where additional data had been collected. The supplemental SIP submittal also included this Order and supporting documents.

6. On <December 19, 2011>, the MPCA put its proposed supplemental SIP submittal on public notice for 45 days. <CITATION.> The public comment period provided Arcelor and members of the general public an opportunity to comment on this Order and the other elements of the proposed supplemental SIP, including the BART emission limits, prior to U.S. EPA's final decision on the SIP.

#### THE FACILITY

7. ArcelorMittal Minorca Mine Inc. (Arcelor) owns and operates a mine and taconite pellet production plant at its facility ("Facility") located near Virginia, Minnesota. Arcelor makes fully fluxed pellets using one straight grate indurating furnace. The furnace burns a maximum of 370 MMBtu/hr of natural gas and is capable of handling 400 tons of pellets per hour. The Facility has three main areas where emissions are created: the mine, the tailings basin, and the pellet plant. The larger sources of regulated air emissions at Arcelor are the indurating furnace operations and the mining activities, with lesser amounts from other processing operations and fugitive dust sources, including haul roads and the tailings basin.

#### **BEST AVAILABLE RETROFIT TECHNOLOGY (BART)**

- 8. The Rule includes 40 CFR § 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which sources may need to install BART and for determining BART.
- 9. To satisfy the Rule, the MPCA determined what constitutes BART for each BART-eligible unit and established emission limits consistent with its determination of BART. As required, the MPCA took into consideration the technology available, the costs of compliance, the energy and the non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. [40 CFR § 51.308(e)(ii)].
- 10. To identify the BART-eligible emission units, MPCA used the following criteria:
  - a. One, or more, emission(s) units at the facility fit within one of the twenty-six (26) categories listed in the 40 CFR 51, Appendix Y *Guidelines*;
  - b. The emission unit(s) were in existence on August 7, 1977 and began operation at some point on or after August 7, 1962; and
  - c. The sum of the potential emissions from all emission unit(s) identified in the previous two bullets was greater than 250 tons per year of the visibility-impairing pollutants: SO<sub>2</sub>, NO<sub>x</sub>, and PM.
- 11. The Facility includes units that are subject to BART. See <u>RESULTS of Best Available Retrofit</u>

  <u>Technology (BART) Modeling to Determine Sources Subject-to-BART in the State of Minnesota at http://proteus.pca.state.mn.us/publications/aq-sip2-07.pdf.</u>
- 12. Arcelor has one unit, the indurating furnace identified as Emission Unit 026 in Air Emissions Permit No. 13700062-003, that is subject-to-BART and for which Arcelor performed a BART analysis. This

#### -DRAFT-

unit has four stack vents. The stack vents associated with the unit are 5V014, SV015, SV016, and SV017.

- 13. MPCA determined and Arcelor agreed that its indurating furnace (EU026) is subject-to-BART.
- 14. The MPCA determined that BART for this unit consists of:
  - a. Operation of the existing wet scrubber to control SO<sub>2</sub> emissions; and
  - Good combustion practices and operation of low NO<sub>X</sub> burners in the pre-heat zone to control NO<sub>X</sub> emissions; and
  - Implementation of the taconite Maximum Achievable Control Technology (MACT) standard to control PM emissions. [40 CFR § 63, Subp. RRRRR].
- 15. The MPCA must place BART emission limits in an enforceable document. [40 CFR § 51.302 (c)(3); 40 CFR § 51.308(e)((1)(iv)]. The MPCA has chosen to issue this Administrative Order as the enforceable document by which to establish the BART emission limit for Arcelor.

#### **LONG-TERM STRATEGY**

- 16. In the SIP, the MPCA established, as part of the long-term strategy, a target or goal of a reduction in combined  $SO_2$  and  $NO_X$  emissions from large point sources located in St. Louis, Lake, Cook, Carlton, Itasca and Koochiching counties that emitted over 100 tons per year of either  $SO_2$  or  $NO_X$  in 2002.
- 17. The MPCA also determined that the six taconite facilities in Minnesota may be undercontrolled, and that very few emission control technologies are known to be effective for the industrial processes involved in taconite production. The MPCA therefore also established a requirement for these facilities to investigate control technologies and pollution prevention practices for their indurating furnaces as part of the long-term strategy.
- 18. The MPCA has determined that an appropriate mechanism for implementing the long-term strategy for the taconite facilities, including Arcelor, is their demonstration that their facilities are in attainment with the one-hour National Ambient Air Quality Standards (NAAQS) for SO<sub>2</sub> [40 CFR § 50.17] and nitrogen dioxide (NO<sub>2</sub>) [40 CFR § 50.11]. As a result, Arcelor must model compliance with the one-hour and SO<sub>2</sub> and NO<sub>2</sub> NAAQS. This Order establishes the tasks and schedules by which the modeling for Arcelor will be completed.

#### <u>ORDER</u>

#### NOW, THEREFORE, ARCELOR IS ORDERED:

- 19. To install and operate any necessary control equipment or undertake any necessary work practices to meet the following requirements, which represent BART for Arcelor.
- BART Emission Limitations and Compliance Methods
  - a. BART for NO<sub>x</sub>

#### i. Emission Limitations

- 1.  $NO_X$  emissions from EU026 shall not exceed 1018.0 lbs/hour at all times that EU026 is operating, measured on a 30-day rolling average.
- Hours during which EU026 does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
- 3. The  $NO_X$  emission limit is effective on and after the date six months after the effective date of U.S. EPA's approval of this BART determination.
- ii. Arcelor must demonstrate compliance with the  $NO_X$  emission limit above as follows:
  - NO<sub>X</sub> stack testing, with simultaneous measurement of emissions from all four stacks for 30 hourly data points, conducted in compliance with Minn. R. 7017.2001 through Minn. R. 7017.2060.
    - a. Initial BART  $NO_X$  performance test. Within 12 months of the date that the emissions limit becomes effective, Arcelor shall conduct a performance test to demonstrate compliance with the BART limit for  $NO_X$  emissions.
    - b. Annual BART  $NO_x$  performance tests. Each calendar year after the initial test, Arcelor shall conduct a performance test to demonstrate compliance with the BART limit for  $NO_x$  emissions. The performance test shall be conducted annually within two months of the anniversary date of the initial BART  $NO_x$  performance test.
    - c. Performance tests shall be conducted using methodology and under such conditions as the Commissioner specifies in the Commissioner's test plan approval.
  - As an alternative to the stack testing required in part 1, Arcelor may install and operate continuous emission monitoring systems (CEMS) to demonstrate compliance on a continuous basis. CEMS shall be operated in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220. Once CEMS are installed and certified, compliance must be determined through use of CEMS.

#### b. BART for SO<sub>2</sub>

#### i. Emission Limitations

1.  $SO_2$  emissions from EU026 shall not exceed 0.165 lbs per long ton of pellets produced at all times that EU026 is operating, measured on a 30-day rolling average basis.

- Hours during which EU026 does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
- 3. The limit applies only when the company is burning natural gas.
- 4. The SO<sub>2</sub> emission limit is effective on and after the date six months after the effective date of EPA's approval of this BART determination.
- ii. Arcelor must demonstrate compliance with the SO<sub>2</sub> emission limit above as follows:
  - SO<sub>2</sub> stack testing, with simultaneous measurement of emissions from all four stacks for 30 hourly data points, conducted in compliance with Minn. R. 7017.2001 through Minn. R. 7017.2060.
    - a. Initial BART  $SO_2$  performance test. Within 12 months of the date that the emissions limit becomes effective, Arcelor shall conduct a performance test to demonstrate compliance with the BART limit for  $SO_2$  emissions.
    - b. Annual BART SO<sub>2</sub> performance tests. Each calendar year after the initial test, Arcelor shall conduct a performance test to demonstrate compliance with the BART limit for SO<sub>2</sub> emissions. Each performance test shall be conducted annually within two months of the anniversary date of the initial BART SO<sub>2</sub> performance test.
    - Performance tests shall be conducted using methodology and under such conditions as the Commissioner specifies in the Commissioner's test plan approval.
    - d. The initial performance test shall also establish the minimum scrubber pressure drop and water flow rate. Arcelor may propose to change the rates following a subsequent performance test pursuant to an approved performance test plan, but must obtain MPCA authorization before implementing a proposed change.
  - Operate and maintain a continuous parametric monitoring system (CPMS)
    to measure and record the daily average scrubber pressure drop and the
    daily average scrubber water flow rate, to demonstrate that the levels
    remain at or above the minimum levels established during the initial and
    subsequent performance tests.

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- i. Arcelor shall not use data recorded during monitor malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels, or to fulfill a minimum data availability requirement. Arcelor shall use all the data collected during all other periods in assessing compliance. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring system to provide valid data. Monitoring failures that are caused in whole or in part by poor maintenance or careless operation are not considered malfunctions.
- 3. As an alternative to the stack testing required in part 1, Arcelor may install and operate continuous emission monitoring systems (CEMS) to demonstrate compliance on a continuous basis. CEMS shall be operated in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220.Once CEMS are installed and certified, compliance must be determined through the use of CEMS.
- c. BART for Particulate Matter (PM)
  - i. Emission Limitations
    - 1. Filterable (front-half) PM emissions from EU026 shall not exceed 0.01 gr/dscf at all times that EU026 is operating.
  - ii. Arcelor must demonstrate compliance with the PM emission limits above using the compliance methods in 40 CFR 63 Subpart RRRRR, the taconite MACT, based on the flow weighted mean concentration of all four stacks associated with EU026.
  - iii. Compliance with the PM emission limit must be demonstrated by the deadlines laid out in 40 CFR 63 Subpart RRRRR.

#### II. Recordkeeping and Reporting

- a. Recordkeeping. Arcelor shall maintain electronic files of all information required by this
  Order in a form suitable for determination of Arcelor's compliance with this Order by EPA or
  MPCA staff and readily available for EPA or MPCA inspection and review.
  - i. Permanent Records: Arcelor shall permanently maintain the following information together with all amendments, revisions, and modifications to this information.
    - 1. Information on NO<sub>X</sub>, SO<sub>2</sub>, and PM emission limits and operational requirements imposed by this Order. These records include this Order.

- ii. Non Permanent Records: Arcelor shall maintain monitoring, testing, startup, shutdown, bypass, breakdowns, excess emissions and noncompliance with operational requirements records pertaining to the requirements of this Order in the manner required in the total Facility requirements of Arcelor's air emissions permit, pursuant to Minn. R. 7007.0800 and. Arcelor shall retain the records for a minimum of five years following the date on which the record was generated. The most recent two years of information must be kept on site.
- b. Reporting. Arcelor shall, in the Semiannual Deviations Report required under Minn. R. 7007.0800, Subp. 6(A)(2), report each instance in which an emission limit was not met. This includes periods of startup, shutdown, and malfunction.
- 20. To conduct the following modeling analyses and submit the following information in order to ensure expeditious attainment of the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS as part of the long-term strategy
- I. Modeling Protocol
  - a. By April 1, 2012, submit to the MPCA a modeling protocol for the Arcelor facility for NO<sub>2</sub> emissions. The protocol must be submitted using MPCA's most recent model protocol forms, AQDMP-01 and AQDMPS-01.
- II. Modeling and Emission Limits Demonstrating Compliance
  - a. By December 15, 2012, submit to the MPCA:
    - i. A modeling demonstration that shows modeled compliance with the one-hour SO<sub>2</sub> NAAQS (40 CFR 50.17) and one-hour NO<sub>2</sub> NAAQS (40 CFR 50.11);
    - ii. A table of proposed emission limits from the facility, by emission unit and stack vent, that result in modeled compliance with the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS;
    - iii. A description of the work practices or controls to be implemented in order to meet the proposed emission limits; and
    - iv. A detailed schedule for implementation of the necessary work practices or controls which ensures that they will be in place and the emission limits achieved by June 30, 2017.

#### General.

- 21. Nothing in this Order shall relieve Arcelor of its obligation to meet permitting requirements for any physical or operational change at its facility.
- 22. This Order is not transferable or assignable to any person without the express written approval of the MPCA.
- 23. This Order is effective upon the date that it is signed by the MPCA Commissioner or his designee.

#### -DRAFT-

# **RESERVATION OF AUTHORITY**

Nothing in this Order shall prevent the MPCA from taking action to enforce the requirements of this Order, or from requiring additional action by the Regulated Party if necessary to ensure compliance with the Regional Haze rule and other MPCA rules and statutes.

IT IS SO ORDERED.

**Minnesota Pollution Control Agency** 

Paul W. Aasen Commissioner

# STATE OF MINNESOTA Minnesota Pollution Control Agency

In the Matter of: Hibbing Taconite Company

#### **ADMINISTRATIVE ORDER**

This Administrative Order (Order) is issued by the Minnesota Pollution Control Agency (MPCA) to Hibbing Taconite Company (HTC) pursuant to Minn. Stat. § 116.07, subd. 9 (2000).

#### **FINDINGS OF FACT**

#### **BACKGROUND**

- On July 6, 2005, the U.S. Environmental Protection Agency (U.S. EPA) published regulations to address visibility impairment in our nation's largest national parks and wilderness ("Class I") areas [70 Fed. Reg. 39103]. This rule is commonly known as the "Regional Haze Rule" [40 CFR §§ 51.300-51.309]. The Regional Haze Rule (Rule) requires that Minnesota establish and achieve visibility goals for each of its Class I areas by 2018.
- 2. The Rule regulates the emission of pollutants that contribute to regional haze. The MPCA has determined that the key pollutants are particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), and nitrogen oxides (NO<sub>x</sub>).
- 3. The Rule requires that Minnesota submit a Regional Haze State Implementation Plan (SIP) to U.S. EPA for its approval. The SIP must include:
  - a. Reasonable Progress Goals Minnesota must establish, for each Class I area within the state, "goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions." [40 CFR § 51.308(d)(1)].
  - b. Long-Term Strategy Minnesota must submit a long-term strategy that addresses regional haze visibility impairment, and includes "measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas." [40 CFR § 51.308(d)(3)].
  - c. Best Available Retrofit Technology The Rule regulates certain stationary sources that could contribute to visibility impairment in Class I areas. States, including Minnesota, must determine what constitutes the best available retrofit technology (BART) to control for PM, SO<sub>2</sub>, and NO<sub>X</sub> and to establish emissions limits that are consistent with BART for these sources. The limits must be included in the SIP for U.S. EPA approval.
- 4. The MPCA submitted a Regional Haze SIP to U.S. EPA on December 30, 2009, which included the required Reasonable Progress Goals and Long-Term Strategy and identified the BART-eligible and subject-to-BART sources, listed the MPCA's BART determinations, and included associated BART emission limits where MPCA had sufficient emissions data to set such limits. On April 1, 2010, U.S. EPA notified the MPCA that the submittal was complete.
- Subsequently, MPCA prepared a supplemental SIP submittal that revised the long-term strategy and included BART emission limits where additional data had been collected. The supplemental SIP submittal also included this Order and supporting documents.

6. On <December 19, 2011>, the MPCA put its proposed supplemental SIP submittal on public notice for 45 days. <CITATION.> The public comment period provided HTC and members of the general public an opportunity to comment on this Order and the other elements of the proposed supplemental SIP, including the BART emission limits, prior to U.S. EPA's final decision on the SIP.

#### THE FACILITY

7. Hibbing Taconite Company (HTC) is a taconite (magnetite) ore mining and beneficiation facility ("Facility) located in Hibbing, Minnesota. HTC is owned by ArcelorMittal, Cliffs Natural Resources, and US Steel; Cliffs Natural Resources is the managing agent. HTC operates three functionally equivalent straight grate indurating furnaces, which are capable of producing a combined 9 million dry tons of pellets annually. The larger sources of air emissions at HTC are from the mining activities and indurating furnace operations, with lesser amounts from other processing operations and fugitive dust sources, including haul roads and the tailings basin.

#### **BEST AVAILABLE RETROFIT TECHNOLOGY (BART)**

- 8. The Rule includes 40 CFR § 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which sources may need to install BART and for determining BART.
- 9. To satisfy the Rule, the MPCA determined what constitutes BART for each BART-eligible unit and established emission limits consistent with its determination of BART. As required, the MPCA took into consideration the technology available, the costs of compliance, the energy and the non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. [40 CFR § 51.308(e)(ii)].
- 10. To identify the BART-eligible emission units, MPCA used the following criteria:
  - a. One, or more, emission(s) units at the facility fit within one of the twenty-six (26) categories listed in the 40 CFR 51, Appendix Y *Guidelines*;
  - b. The emission unit(s) were in existence on August 7, 1977 and began operation at some point on or after August 7, 1962; and
  - c. The sum of the potential emissions from all emission unit(s) identified in the previous two bullets was greater than 250 tons per year of the visibility-impairing pollutants: SO<sub>2</sub>, NO<sub>X</sub>, and PM.
- 11. The Facility includes units that are subject to BART. See RESULTS of Best Available Retrofit

  Technology (BART) Modeling to Determine Sources Subject-to-BART in the State of Minnesota at http://proteus.pca.state.mn.us/publications/aq-sip2-07.pdf.
- 12. HTC has three units, the pelletizing furnaces identified as Emission Units 020, 021 and 022 in Air Emissions Permit No. 13700061-004, that are subject-to-BART and for which HTC performed a BART analysis. Each unit has four stack vents. The stack vents associated with EU020, the Line 1 pelletizing furnace, are SV021, SV022, SV023 and SV024. The stack vents associated with EU021, the Line 2

- pelletizing furnace, are SV025, SV026, SV027, and SV028. The stack vents associated with EU022, the Line 3 pelletizing furnace, are SV029, SV030, SV031, and SV032.
- 13. MPCA and HTC agreed that its three pelletizing furnaces (EU020, EU021, and EU022) are subject-to-BART.
- 14. The MPCA determined that BART for these units consists of
  - a. Operation of the existing wet scrubber to control SO<sub>2</sub> emissions; and
  - b. Good combustion practices to control NO<sub>x</sub> emissions; and
  - c. Implementation of the taconite Maximum Achievable Control Technology (MACT) standard to control PM emissions. [40 CFR § 63, Subp. RRRRR].
- 15. The MPCA must place BART emission limits in an enforceable document. [40 CFR § 51.302 (c)(3); 40 CFR § 51.308(e)((1)(iv)]. The MPCA has chosen to issue this Administrative Order as the enforceable document by which to establish the BART emission limit for HTC.

#### **LONG-TERM STRATEGY**

- 16. In the SIP, the MPCA established, as part of the long-term strategy, a target or goal of a reduction in combined  $SO_2$  and  $NO_X$  emissions from large point sources located in St. Louis, Lake, Cook, Carlton, Itasca and Koochiching counties that emitted over 100 tons per year of either  $SO_2$  or  $NO_X$  in 2002.
- 17. The MPCA also determined that the six taconite facilities in Minnesota may be undercontrolled, and that very few emission control technologies are known to be effective for the industrial processes involved in taconite production. The MPCA therefore also established a requirement for these facilities to investigate control technologies and pollution prevention practices for their indurating furnaces as part of the long-term strategy.
- 18. The MPCA has determined that an appropriate mechanism for implementing the long-term strategy for the taconite facilities, including HTC, is their demonstration that their facilities are in attainment with the one-hour National Ambient Air Quality Standards (NAAQS) for SO<sub>2</sub> [40 CFR § 50.17] and nitrogen dioxide (NO<sub>2</sub>) [40 CFR § 50.11]. As a result, HTC must model compliance with the one-hour and SO<sub>2</sub> and NO<sub>2</sub> NAAQS. This Order establishes the tasks and schedules by which the modeling for HTC will be completed.

#### <u>ORDER</u>

#### NOW, THEREFORE, HTC IS ORDERED:

- 19. To install and operate any necessary control equipment or undertake any necessary work practices in order to meet the following requirements, which represent BART for HTC.
- I. BART Emission Limitations and Compliance Methods
  - a. BART for Nitrogen Oxides (NO<sub>X</sub>)

#### i. Emission Limitations

- 1. NO<sub>X</sub> emissions from Line 1, EU020, shall not exceed 447.4 lbs/hour at all times that EU020 is operating, measured on a 30-day rolling average;
- 2. NO<sub>X</sub> emissions from Line 2, EU021, shall not exceed 571.7 lbs/hour at all times that EU021 is operating, measured on a 30-day rolling average;
- 3. NO<sub>x</sub> emissions from Line 3, EU022, shall not exceed 338.3 lbs/hour at all times that EU022 is operating, measured on a 30-day rolling average.
- 4. Hours during which the subject emission unit does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
- 5. These NO<sub>X</sub> emission limits are effective on and after the date six months after the effective date of U.S. EPA's approval of this BART determination.
- ii. HTC must demonstrate compliance with the NO<sub>X</sub> emission limits above as follows:
  - NO<sub>X</sub> stack testing with simultaneous measurement of emissions from all four stacks for 30 hourly data points, conducted in compliance with Minn. R. 7017.2001 through Minn. R. 7017.2060.
    - a. Initial BART  $NO_X$  performance test. Within 12 months of the date that the limit becomes effective, HTC shall conduct a performance test to demonstrate compliance with the BART limit for  $NO_X$  emissions.
    - b. Annual BART  $NO_x$  performance tests. Each calendar year after the initial test, HTC shall conduct a performance test to demonstrate compliance with the BART limit for  $NO_x$  emissions. The performance test shall be conducted between 10 months and 14 months after the previous BART  $NO_x$  performance test.
    - c. Performance tests shall be conducted using test methodology and under such conditions as the Commissioner specifies in the Commissioner's test plan approval, based on representative performance of the affected source.
- b. As an alternative to the stack testing required in part 1, HTC may install and operate continuous emission monitoring systems (CEMS) to demonstrate compliance on a continuous basis. CEMS shall be operated in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220. Once CEMS are installed and certified, compliance must be determined through the use of CEMS.BART for Sulfur Dioxide (SO<sub>2</sub>)

#### i. Emission Limitations

- 1. SO<sub>2</sub> emissions from Line 1, EU020, shall not exceed 0.207 lbs SO<sub>2</sub>/long ton of pellets fired (finished) at all times that EU020 is operating, measured on a 30-day rolling average;
- SO₂ emissions from Line 2, EU021, shall not exceed 0.207 lbs SO₂/long ton
  of pellets fired (finished) at all times that EU021 is operating, measured on
  a 30-day rolling average;
- 3. SO<sub>2</sub> emissions from Line 3, EU022, shall not exceed 0.207 lbs SO<sub>2</sub>/long ton of pellets fired (finished) at all times that EU022 is operating, measured on a 30-day rolling average.
- 4. Each limit applies only when the company is burning natural gas.
- Hours during which the subject emission unit does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
- 6. These  $SO_2$  emission limits are effective on and after the date six months after the effective date of U.S. EPA's approval of this BART determination.
- ii. HTC must demonstrate compliance with the SO<sub>2</sub> emission limits as follows:
  - SO<sub>2</sub> stack testing, with simultaneous measurement of emissions from all four stacks for 30 hourly data points, conducted in compliance with Minn. R. 7017.2001 through Minn. R. 7017.2060.
    - a. Initial BART SO<sub>2</sub> performance test. Within 12 months of the date that the emissions limit becomes effective, HTC shall conduct a performance test to demonstrate compliance with the BART limit for SO<sub>2</sub> emissions.
    - b. Annual BART SO<sub>2</sub> performance tests. Each calendar year after the initial test, HTC shall conduct a performance test to demonstrate compliance with the BART limit for SO<sub>2</sub> emissions. The performance test shall be conducted between 10 months and 14 months after the previous BART SO<sub>2</sub> performance test.
    - c. Performance tests shall be conducted using test methodology and under such conditions as the Commissioner specifies in the Commissioner's test plan approval.

- d. The initial performance test shall also establish the minimum scrubber pressure drop and water flow rate. HTC may propose to change the rates following a subsequent performance test pursuant to an approved performance test plan, but must obtain MPCA authorization before implementing a proposed change.
- Operate and maintain a continuous parametric monitoring system (CPMS)
  to measure the daily average scrubber pressure drop and the daily average
  scrubber water flow rate, to demonstrate that the levels remain at or above
  the minimum levels established during the initial and subsequent
  performance tests.
  - i. HTC shall not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels, or to fulfill a minimum data availability requirement. HTC shall use all the data collected during all other periods in assessing compliance. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring system to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not considered malfunctions.
- As an alternative to the stack testing laid out in part 1, HTC may install and operate continuous emission monitoring systems (CEMS) to demonstrate compliance on a continuous basis.
  - a. Once CEMS are installed and certified, compliance must be determined through the use of CEMS.
  - b. CEMS shall be operated in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220.
- iii. Compliance with these limits must be demonstrated by six months after the effective date of EPA's approval of this BART determination.
- c. BART for Particulate Matter (PM)
  - i. Emission Limitations
    - 1. Filterable (front-half) PM emissions from Line 1, EU020, shall not exceed 0.01 gr/dscf at all times EU020 is operating; and
    - Filterable (front-half) PM emissions from Line 2, EU021, shall not exceed
       0.01 gr/dscf at all times EU021 is operating; and
    - 3. Filterable (front-half) PM emissions from Line 3, EU022, shall not exceed 0.01 gr/dscf at all times EU022 is operating.

- ii. Compliance with the PM emission limits above will be determined using the compliance methods laid out 40 CFR 63 Subpart RRRRR, the taconite MACT, and determined based on the flow weighted mean concentration of all stacks associated with the subject emission unit.
- iii. Compliance with the PM emission limit must be demonstrated by the deadlines laid out in the taconite MACT.

#### II. Installation of Continuous Emission Monitoring Systems (CEMS)

- a. Within 60 days of the effective date of this Order, HTC shall submit to the MPCA a Plan which provides a schedule for the installation of one SO<sub>2</sub> and one NO<sub>X</sub> CEMS on the Line 2 pelletizing furnace, EU021, measuring emissions from SV025, SV026, SV027, and SV028. The Plan shall provide that each CEMS is installed and certification test results that report certification are submitted to the MPCA no later than one year after the due date of the Plan.
- b. HTC shall conform to the CEMS requirements specified in Minn. R. chs. 7017.1002, 7017.1030, 7017.1035, 7017.1040, 7017.1050, 7017.1060, 7017.1070, 7017.1080, 7017.1090, 7017.1100, 7017.1110, 7017.1120, subps. 2, 3, and 4, 7017.1130, 7017.1140, 7017.1150, 7017.1160, 7017.1170 and 7017.1180.
- c. Once installed, HTC shall continuously operate the CEMS under this Order at all times when the associated process equipment is operating.
- d. Once installed and certified, the CEMS shall be used to determine compliance with the Line 2 pelletizing furnace NO<sub>X</sub> emissions limit shown in Part 1.a.i and SO<sub>2</sub> emissions limit shown in Part 1.b.i of this Order.

#### III. Recordkeeping and Reporting

- a. Recordkeeping. HTC shall maintain electronic files of all information required by this Order in a form suitable for determination of HTC's compliance with this Order by U.S. EPA or MPCA staff and readily available for U.S. EPA or MPCA inspection and review.
  - i. Permanent Records: HTC shall permanently maintain the following information together with all amendments, revisions, and modifications to this information.
    - 1. Information on NO<sub>X</sub>, SO<sub>2</sub>, and PM emission limits and operational requirements imposed by this Order. These records include this Order.
  - ii. Non Permanent Records: HTC shall maintain monitoring, testing, startup, shutdown, bypass, breakdowns, excess emissions and noncompliance with operational requirements records pertaining to the requirements of this Order in the manner required in the total Facility requirements of HTC's air emissions permit, pursuant to Minn. R. 7007.0800 and. HTC shall retain the records for a minimum of five years following the date on which the record was generated. The most recent two years of information must be kept on site.

- Reporting. HTC shall, in the Semiannual Deviations Report required under Minn. R. 7007.0800, Subp. 6(A)(2), report each instance in which an emission limit was not met. This includes periods of startup, shutdown, and malfunction.
- 20. To conduct the following modeling analyses and submit the following information in order to ensure expeditious attainment of the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS as part of the long-term strategy
- I. Modeling Protocol
  - a. By April 1, 2012, submit to the MPCA a modeling protocol for the HTC for NO<sub>2</sub> emissions. The protocol must be submitted using MPCA's most recent model protocol forms, AQDMP-01 and AQDMPS-01.
- II. Modeling and Emission Limits Demonstrating Compliance
  - a. By December 15, 2012, submit to the MPCA:
    - i. A modeling demonstration that shows modeled compliance with the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS;
    - ii. A table of proposed emission limits from the facility, by emission unit and stack vent, that result in modeled compliance with the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS;
    - iii. A description of the work practices or controls to be implemented in order to meet the proposed emission limits; and
    - iv. A detailed schedule for implementation of the necessary work practices or controls which ensures that they will be in place and the emission limits achieved by June 30, 2017.

#### General.

- 21. Nothing in this Order shall relieve HTC of its obligation to meet permitting requirements for any physical or operational change at its facility.
- 22. This Order is not transferable or assignable to any person without the express written approval of the MPCA.
- 23. This Order is effective upon the date that it is signed by the MPCA Commissioner or his designee.

#### -DRAFT-

#### **RESERVATION OF AUTHORITY**

Nothing in this Order shall prevent the MPCA from taking action to enforce the requirements of this Order, or from requiring additional action by the Regulated Party if necessary to ensure compliance with the Regional Haze rule and other MPCA rules and statutes.

IT IS SO ORDERED.

**Minnesota Pollution Control Agency** 

Paul W. Aasen Commissioner

# STATE OF MINNESOTA Minnesota Pollution Control Agency

In the Matter of:

ADMINISTRATIVE ORDER

Northshore Mining Company - Silver Bay

This Administrative Order (Order) is issued by the Minnesota Pollution Control Agency (MPCA) to Northshore Mining Company — Silver Bay (NSM) pursuant to Minn. Stat. § 116.07, subd. 9 (2000).

#### FINDINGS OF FACT

#### **BACKGROUND**

- On July 6, 2005, the U.S. Environmental Protection Agency (U.S. EPA) published regulations to address visibility impairment in our nation's largest national parks and wilderness ("Class I") areas [70 Fed. Reg. 39103]. This rule is commonly known as the "Regional Haze Rule" [40 CFR §§ 51.300-51.309]. The Regional Haze Rule (Rule) requires that Minnesota establish and achieve visibility goals for each of its mandatory Class I areas by 2018.
- 2. The Rule regulates the emission of pollutants that contribute to regional haze. The MPCA has determined that the key pollutants contributing to regional haze are particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), and nitrogen oxides (NO<sub>X</sub>).
- 3. The Rule requires that Minnesota submit a Regional Haze State Implementation Plan (SIP) to U.S. EPA for its approval. The SIP must include:
  - a. Reasonable Progress Goals Minnesota must establish, for each Class I area within the state, "goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions." [40 CFR § 51.308(d)(1)].
  - b. Long-Term Strategy Minnesota must submit a long-term strategy that addresses regional haze visibility impairment, and includes "measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas." [40 CFR § 51.308(d)(3)].
  - c. Best Available Retrofit Technology The Rule regulates certain stationary sources that could contribute to visibility impairment in Class I areas. States, including Minnesota, must determine what constitutes the best available retrofit technology (BART) to control for PM, SO<sub>2</sub>, and NO<sub>X</sub> and to establish emissions limits that are consistent with BART for these sources. The limits must be included in the SIP for U.S. EPA approval.
- 4. The MPCA submitted a Regional Haze SIP to U.S. EPA on December 30, 2009, which included the required Reasonable Progress Goals and Long-Term Strategy and identified the BART-eligible and subject-to-BART sources, listed the MPCA's BART determinations, and included associated BART emission limits where MPCA had sufficient emissions data to set such limits. On April 1, 2010, U.S. EPA notified the MPCA that the submittal was complete.
- 5. Subsequently, MPCA prepared a supplemental SIP submittal that revised the long-term strategy and included BART emission limits where additional data had been collected. The supplemental SIP submittal also included this Order and supporting documents.

6. On <December 19, 2011>, the MPCA put its proposed supplemental SIP submittal on public notice for 45 days. <CITATION.> The public comment period provided NSM and members of the general public an opportunity to comment on this Order and the other elements of the proposed supplemental SIP, including the BART emission limits, prior to U.S. EPA's final decision on the SIP.

#### **THE FACILITY**

- 7. Northshore Mining Company Silver Bay (NSM) is located on the north shore of Lake Superior. It was the first taconite operation in Minnesota, originally built in the mid-1950s by Reserve Mining Company. Cleveland Cliffs, Incorporated purchased the facility from Cyprus Minerals in 1994; Cliffs Natural Resources now owns and operates the facility.
- 8. NSM has four indurating furnaces. Furnaces 11 and 12 began operating in 1963. Furnaces 11 and 12 were manufactured by Arthur G. McKee and are NSM's largest indurating furnaces. They each burn a maximum of 150 MMBtu/hr of natural gas and are capable of processing 300 tons of pellets per hour. The other two furnaces, Furance 5 and Furnace 6, began operation prior to 1962. Furnace 5 was shut down for several years; in 2006, NSM received a Prevention of Significant Deterioration permit authorizing the restarting of Furnace 5.
- NSM also operates two process boilers. Both process boilers were installed in 1965 and are rated at 79 MMBtu/hr. The boilers are capable of burning fuel oil and natural gas.

#### **BEST AVAILABLE RETROFIT TECHNOLOGY (BART)**

- 10. The Rule includes 40 CFR 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which sources may need to install BART and for determining BART.
- 11. To satisfy the Rule, the MPCA determined what constitutes BART for each BART-eligible unit and established emission limits consistent with its determination of BART. As required, the MPCA took into consideration the technology available, the costs of compliance, the energy and the non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. (40 CFR 51.308(e)(ii).)
- 12. To identify the BART-eligible emission units, MPCA used the following criteria:
  - a. One, or more, emission(s) units at the facility fit within one of the twenty-six (26) categories listed in the 40 CFR 51, Appendix Y *Guidelines*;
  - b. The emission unit(s) were in existence on August 7, 1977 and began operation at some point on or after August 7, 1962; and
  - c. The sum of the potential emissions from all emission unit(s) identified in the previous two bullets was greater than 250 tons per year of the visibility-impairing pollutants: SO<sub>2</sub>, NO<sub>x</sub>, and PM.

- 13. The facility includes units that are subject to BAR*T*. See RESULTS of Best Available Retrofit Technology (BART) Modeling to Determine Sources Subject-to-BART in the State of Minnesota at <a href="http://proteus.pca.state.mn.us/publications/aq-sip2-07.pdf">http://proteus.pca.state.mn.us/publications/aq-sip2-07.pdf</a>.
- 14. NSM has four units, the indurating furnaces identified as Emission Units 100/104, and 110/113 and the process boilers identified as Emission Units 003 and 004 in Air Emissions Permit No. 07500003-007, that are subject-to-BART and for which NSM performed a BART analysis. The stack vents associated with Furnace 11, EU100/EU104, are SV101, SV102, SV103, SV104, and SV105. The stack vents associated with Furnace 12, EU110/EU114, are SV111, SV112, SV113, SV114, and SV115. The stack vent associated with process boiler #1, EU003, is SV003. The stack vent associated with process boiler #2, EU004, is SV003.
- 15. MPCA determined and NSM agreed that two of NSM's indurating furnaces (Furnace 11 and Furnace 12) and two of NSM's process boilers (boiler #1 and boiler #2) are subject-to-BART.
- 16. The MPCA determined that BART for the indurating furnaces consists of
  - a. Operation of the existing wet scrubber to control SO<sub>2</sub> emissions;
  - b. Good combustion practices to control NO<sub>x</sub> emissions; and
  - Implementation of the taconite Maximum Achievable Control Technology (MACT) standard to control PM emissions. [40 CFR § 63, Subp. RRRRR].
- 17. The MPCA determined that BART for the process boilers consists of existing design and permitted fuels.
- 18. The MPCA must place BART emission limits in an enforceable document. [40 CFR § 51.302(c)(3); 40 CFR § 51.308(e)((1)(iv)]. The MPCA has chosen to issue this Administrative Order as the enforceable document by which to establish the BART emission limit for NSM.

#### **LONG-TERM STRATEGY**

- 19. In the SIP, the MPCA established, as part of the long-term strategy, a target or goal of a reduction in combined SO<sub>2</sub> and NO<sub>X</sub> emissions from large point sources located in St. Louis, Lake, Cook, Carlton, Itasca and Koochiching counties that emitted over 100 tons per year of either SO<sub>2</sub> or NO<sub>X</sub> in 2002.
- 20. The MPCA also determined that the six taconite facilities in Minnesota may be undercontrolled, and that very few emission control technologies are known to be effective for the industrial processes involved in taconite production. The MPCA therefore also established a requirement for these facilities to investigate control technologies and pollution prevention practices for their indurating furnaces as part of the long-term strategy.
- 21. The MPCA has determined that an appropriate mechanism for implementing the long-term strategy for the taconite facilities, including NSM, is their demonstration that their facilities are in attainment with the one-hour National Ambient Air Quality Standards (NAAQS) for SO<sub>2</sub> [40 CFR § 51.17] and nitrogen dioxide (NO<sub>2</sub>) [40 CFR § 51.11]. As a result, NSM must model compliance with the one-hour and SO<sub>2</sub> and NO<sub>2</sub> NAAQS. This Order establishes the tasks and schedules by which the modeling for NSM will be completed.

#### **ORDER**

#### NOW, THEREFORE, NSM IS ORDERED:

- 22. To install and operate any necessary control equipment or undertake any necessary work practices in order to meet the following requirements, which represent BART for NSM.
- I. Process Boiler BART Emission Limitations and Compliance Methods
  - a. BART for NO<sub>x</sub>
    - i. Emission Limitations
      - NO<sub>x</sub> emissions from Process Boiler #1 (EU003) shall not exceed 0.17 lbs/hour at all times when EU003 is operating, measured on a 30-day rolling average.
      - NO<sub>X</sub> emissions from Process Boiler #2 (EU004) shall not exceed 0.17 lbs/hour at all times when EU004 is operating, measured on a 30-day rolling average.
      - 3. Hours during which the unit does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
      - 4. The NO<sub>x</sub> emission limit is effective on and after the date six months after the effective date of U.S. EPA's approval of this BART determination.
    - ii. NSM must demonstrate compliance with the NO<sub>X</sub> emission limits above will as follows:
      - 1. NO<sub>X</sub> stack testing, conducted in compliance with Minn. R. 7017.2001 through Minn. R. 7017.2060.
        - a. Initial BART  $NO_X$  performance test. Within 12 months of the date that the emissions limit becomes effective, NSM shall conduct a performance test to demonstrate compliance with the BART limit for  $NO_X$  emissions.
        - b. BART  $NO_x$  performance tests. NSM shall conduct a performance test to demonstrate compliance with the BART limit for  $NO_x$  emissions once every five years.
        - Performance tests shall be conducted using methodology and under such conditions as the Commissioner specifies in the Commissioner's test plan approval.

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- II. Furnace BART Emission Limitations and Compliance Methods
  - a. BART for NO<sub>x</sub>
    - i. Emission Limitations
      - 1. NO<sub>X</sub> emissions from Furnace 11 shall not exceed 115.5 lbs/hour as all times when Furnace 11 is operating, measured on a 30-day rolling average;
      - 2.  $NO_X$  emissions from Furnace 12 shall not exceed 115.5 lbs/hour at all times when Furnace 12 is operating, measured on a 30-day rolling average.
      - 3. Hours during which the emission unit does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
      - 4. The NO<sub>X</sub> emission limit is effective on and after the date six months after the effective date of U.S. EPA's approval of this BART determination.
    - ii. NSM must demonstrate compliance with the  $NO_X$  emission limits above as follows:
      - 1.  $NO_X$  stack testing, with simultaneous measurement of emissions from all four stacks for 30 hourly data points, conducted in compliance with Minn. R. 7017.2001 through Minn. R. 7017.2060.
        - a. Initial BART NO $_{\rm X}$  performance test. Within 12 months of the date that the limit becomes effective, NSM shall conduct a performance test to demonstrate compliance with the BART limit for NO $_{\rm X}$  emissions.
        - b. Annual BART NO<sub>x</sub> performance tests. Each calendar year after the initial test, NSM shall conduct a performance test to demonstrate compliance with the BART limit for NO<sub>x</sub> emissions. The performance test shall be conducted between 10 months and 14 months after the previous BART NO<sub>x</sub> performance test.
        - c. Performance tests shall be conducted using methodology and under such conditions as the Commissioner specifies in the Commissioner's test plan approval.
        - a. As an alternative to the stack testing laid out in part 1, NSM may install and operate continuous emission monitoring systems (CEMS) to demonstrate compliance on a continuous basis. CEMS shall be operated in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220. Once CEMS are installed and certified, compliance must be determined through the use of CEMS.

#### b. BART for Sulfur Dioxide (SO<sub>2</sub>)

#### i. Emission Limitations

- 1. SO<sub>2</sub> emissions from Furnace 11 shall not exceed 0.0651 lbs SO<sub>2</sub>/long ton of pellets fired (finished), measured on a 30-day rolling average;
- 2.  $SO_2$  emissions from Furnace 12 shall not exceed 0.0651 lbs  $SO_2$ /long ton of pellets fired (finished), measured on a 30-day rolling average.
- 3. This limit applies only when the subject emission unit is burning natural gas.
- 4. Hours during which the subject emission unit does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
- 5. The SO<sub>2</sub> emissions limits are effective on and after the date six months after the effective date of U.S. EPA's approval of this BART determination.
- ii. Compliance with the SO<sub>2</sub> emission limits above will be determined as follows:
  - 1. Annual SO<sub>2</sub> stack testing, with simultaneous measurement of emissions from all four stacks for 30 hourly data points, conducted in compliance with Minn. R. 7017.2001 through Minn. R. 7017.2060.
    - a. Initial BART  $SO_2$  performance test. Within 12 months of the date that the limit becomes effective, NSM shall conduct a performance test to demonstrate compliance with the BART limit for  $SO_2$  emissions.
    - b. Annual BART SO<sub>2</sub> performance tests. Each calendar year after the initial test, NSM shall conduct a performance test to demonstrate compliance with the BART limit for SO<sub>2</sub> emissions. The performance test shall be conducted between 10 months and 14 months after the previous BART SO<sub>2</sub> performance test.
    - Performance tests shall be conducted using methodology and under such conditions as the Commissioner specifies in the Commissioner's test plan approval.

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d. The initial performance test shall also establish the minimum scrubber pressure drop and water flow rate. NSM may propose to change the rates following a subsequent performance test pursuant to an approved performance test plan, but must obtain MPCA authorization before implementing a proposed change.

- Operate and maintain a continuous parametric monitoring system (CPMS)
  to measure the daily average scrubber pressure drop and the daily average
  scrubber water flow rate, to demonstrate that the levels remain at or above
  the minimum levels established during the initial and subsequent
  performance tests.
  - i. NSM shall not use data recorded during monitoring malfunctions, associated repairs, and required quality assurance or control activities in data averages and calculations used to report emission or operating levels, or to fulfill a minimum data availability requirement. NSM shall use all the data collected during all other periods in assessing compliance. A monitoring malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring system to provide valid data. Monitoring failures that are caused in part by poor maintenance or careless operation are not considered malfunctions.
- 3. As an alternative to the stack testing laid out in part 1, NSM may install and operate continuous emission monitoring systems (CEMS) to demonstrate compliance on a continuous basis. CEMS shall be operated in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220. Once CEMS are installed and certified, compliance must be determined through the use of CEMS.
- c. BART for Particulate Matter (PM)
  - i. Emission Limitations
    - 1. Filterable (front-half) PM emissions from EU100 shall not exceed 0.01 gr/dscf at all times when EU100 is operating;
    - 2. Filterable (front-half) PM emissions from EU104 shall not exceed 0.01 gr/dscf at all times when EU104 is operating;
    - 3. Filterable (front-half) PM emissions from EU110 shall not exceed 0.01 gr/dscf at all times when EU110 is operating; and
    - 4. Filterable (front-half) PM emissions from EU114 shall not exceed 0.01 gr/dscf at all times when EU1114 is operating.
  - ii. Compliance with the PM emission limits above will be determined using the compliance methods laid out in 40 CFR 63 Subpart RRRRR, the taconite MACT, and determined based on the flow weighted mean concentration of all stacks for the furnace.
  - iii. Compliance with the PM emission limit must be demonstrated by the deadlines laid out in the taconite MACT.

#### III. Recordkeeping and Reporting

- a. Recordkeeping. NSM shall maintain electronic files of all information required by this Order in a form suitable for determination of NSM's compliance with this Order by U.S. EPA or MPCA staff and readily available for U.S. EPA or MPCA inspection and review.
  - i. Permanent Records: NSM shall permanently maintain the following information together with all amendments, revisions, and modifications to this information.
    - 1. Information on NO<sub>X</sub>, SO<sub>2</sub>, and PM emission limits and operational requirements imposed by this Order. These records include this Order.
  - ii. Non Permanent Records: NSM shall retain monitoring, testing, startup, shutdown, bypass, breakdowns, excess emissions and noncompliance with operational requirements records pertaining to the requirements of this Order in the manner required in the total Facility requirements of NSM's air emissions permit, pursuant to Minn. R. 7007.0800 and. NSM shall retain the records for a minimum of five years following the date on which the record was generated. The most recent two years of information must be kept on site.
- b. Reporting. NSM shall, in the Semiannual Deviations Report required under Minn. R. 7007.0800, Subp. 6(A)(2), report each instance in which an emission limit was not met. This includes periods of startup, shutdown, and malfunction.
- 23. To conduct the following modeling analyses and submit the following information in order to ensure expeditious attainment of the one-hour  $SO_2$  and  $NO_2$  NAAQS as part of the long-term strategy
- I. Modeling Protocol
  - a. By April 1, 2012, submit to the MPCA a modeling protocol for the NSM facility for NO<sub>2</sub> emissions. The protocol must be submitted using MPCA's most recent model protocol forms, AQDMP-01 and AQDMPS-01.
- II. Modeling and Emission Limits Demonstrating Compliance
  - a. By December 15, 2012, submit to the MPCA:
    - A modeling demonstration that shows modeled compliance with the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS;
    - ii. A table of proposed emission limits from the facility, by emission unit and stack vent, that result in modeled compliance with the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS;
    - iii. A description of the work practices or controls to be implemented in order to meet the proposed emission limits; and
    - iv. A detailed schedule for implementation of the necessary work practices or controls which ensures that they will be in place and the emission limits achieved by June 30, 2017.

#### -DRAFT-

#### General.

- 24. Nothing in this Order shall relieve NSM of its obligation to meet permitting requirements for any physical or operational change at its facility.
- 25. This Order is not transferable or assignable to any person without the express written approval of the MPCA.
- 26. This Order is effective upon the date that it is signed by the MPCA Commissioner or his designee.

#### **RESERVATION OF AUTHORITY**

Nothing in this Order shall prevent the MPCA from taking action to enforce the requirements of this Order, or from requiring additional action by the Regulated Party if necessary to ensure compliance with the Regional Haze rule and other MPCA rules and statutes.

IT IS SO ORDERED.

**Minnesota Pollution Control Agency** 

Paul W. Aasen Commissioner

# STATE OF MINNESOTA Minnesota Pollution Control Agency

In the Matter of: United Taconite, LLC

#### **ADMINISTRATIVE ORDER**

This Administrative Order (Order) is issued by the Minnesota Pollution Control Agency (MPCA) to United Taconite, LLC (United) pursuant to Minn. Stat. § 116.07, subd. 9 (2011).

#### FINDINGS OF FACT

#### **BACKGROUND**

- On July 6, 2005, the U.S. Environmental Protection Agency (U.S. EPA) published regulations to address visibility impairment in our nation's largest national parks and wilderness ("Class I") areas [70 Fed. Reg. 39103]. This rule is commonly known as the "Regional Haze Rule" [40 CFR §§ 51.300-51.309]. The Regional Haze Rule (Rule) requires that Minnesota establish and achieve visibility goals for each of its mandatory Class I areas by 2018.
- 2. The Rule regulates the emission of pollutants that contribute to regional haze. The MPCA has determined that the key pollutants contributing to regional haze are particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), and nitrogen oxides (NO<sub>X</sub>).
- 3. The Rule requires that Minnesota submit a Regional Haze State Implementation Plan (SIP) to U.S. EPA for its approval. The SIP must include:
  - a. Reasonable Progress Goals Minnesota must establish, for each Class I area within the state, "goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions." [40 CFR § 51.308(d)(1)].
  - b. Long-Term Strategy Minnesota must submit a long-term strategy that addresses regional haze visibility impairment, and includes "measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas." [40 CFR § 51.308(d)(3)].
  - c. Best Available Retrofit Technology The Rule regulates certain stationary sources that could contribute to visibility impairment in Class I areas. States, including Minnesota, must determine what constitutes the best available retrofit technology (BART) to control for PM, SO<sub>2</sub>, and NO<sub>X</sub> and to establish emissions limits that are consistent with BART for these sources. The limits must be included in the SIP for U.S. EPA approval.
- 4. The MPCA submitted a Regional Haze SIP to U.S. EPA on December 30, 2009, which included the required Reasonable Progress Goals and Long-Term Strategy and identified the BART-eligible and subject-to-BART sources, listed the MPCA's BART determinations, and included associated BART emission limits where MPCA had sufficient emissions data to set such limits. On April 1, 2010, U.S. EPA notified the MPCA that the submittal was complete.
- 5. Subsequently, MPCA prepared a supplemental SIP submittal that revised the long-term strategy and included BART emission limits where additional data had been collected. The supplemental SIP submittal also included this Order and supporting documents.

6. On <December 19, 2011>, the MPCA put its proposed supplemental SIP submittal on public notice for 45 days. <CITATION.> The public comment period provided United and members of the general public an opportunity to comment on this Order and the other elements of the proposed supplemental SIP, including the BART emission limits, prior to U.S. EPA's final decision on the SIP.

#### **THE FACILITY**

7. United produces taconite pellets at its facility (herein referred to as "Facility") located near Forbes, Minnesota. This facility has two indurating Allis-Chalmers furnaces. Line 1 is the smaller of the two, with a rated throughput of 280 tons of pellets per hour and a heat input of 190 MMBtu per hour of natural gas. The newer line, Line 2, is rated at 672 tons per hour with a heat input from natural gas, coal, petroleum coke, and other fuels of 400 MMBtu per hour.

#### **BEST AVAILABLE RETROFIT TECHNOLOGY (BART)**

- 8. The Rule includes 40 CFR 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which sources may need to install BART and for determining BART.
- 9. To satisfy the Rule, the MPCA determined what constitutes BART for each BART-eligible unit and established emission limits consistent with its determination of BART. As required, the MPCA took into consideration the technology available, the costs of compliance, the energy and the non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. [40 CFR § 51.308(e)(ii)].
- 10. To identify the BART-eligible emission units, MPCA used the following criteria:
  - a. One, or more, emission(s) units at the facility fit within one of the twenty-six (26) categories listed in the 40 CFR 51, Appendix Y *Guidelines*;
  - b. The emission unit(s) were in existence on August 7, 1977 and began operation at some point on or after August 7, 1962; and
  - c. The sum of the potential emissions from all emission unit(s) identified in the previous two bullets was greater than 250 tons per year of the visibility-impairing pollutants:  $SO_2$ ,  $NO_X$ , and PM.
- 11. The United facility includes two units (EU040 and EU042) that are subject to BART. See <u>RESULTS of Best Available Retrofit Technology (BART) Modeling to Determine Sources Subject-to-BART in the State of Minnesota at http://proteus.pca.state.mn.us/publications/aq-sip2-07.pdf.</u>
- 12. United's two pellet furnaces, Line 1 (EU040 with SV046) and Line 2 (EU042 with SV048 and SV049), were determined to be subject-to-BART and for which a BART analysis was performed.
- 13. MPCA determined and United agreed that the pellet furnaces (EU040 and EU042) are subject-to-BART.
- 14. The MPCA determined that BART for this unit consists of

- a. Operation of the existing wet scrubber and use of appropriate fuel blends to control SO<sub>2</sub> emissions;
- b. Good combustion practices, along with existing combustion controls to control  $NO_X$  emissions; and
- c. Implementation of the taconite Maximum Achievable Control Technology (MACT) standard to control PM emissions. [40 CFR § 63, Subp. RRRRR].
- 15. The MPCA must place BART emission limits in an enforceable document. [40 CFR § 51.302(c)(3); 40 CFR § 51.308(e)((1)(iv)]. The MPCA has chosen to issue this Administrative Order as the enforceable document by which to establish the BART emission limit for United.

### **LONG-TERM STRATEGY**

- 16. In the SIP, the MPCA established, as part of the long-term strategy, a target or goal of a reduction in combined SO<sub>2</sub> and NO<sub>X</sub> emissions from large point sources located in St. Louis, Lake, Cook, Carlton, Itasca and Koochiching counties that emitted over 100 tons per year of either SO<sub>2</sub> or NO<sub>X</sub> in 2002.
- 17. The MPCA also determined that the six taconite facilities in Minnesota may be undercontrolled, and that very few emission control technologies are known to be effective for the industrial processes involved in taconite production. The MPCA therefore also established a requirement for these facilities to investigate control technologies and pollution prevention practices for their indurating furnaces as part of the long-term strategy.
- 18. The MPCA has determined that an appropriate mechanism for implementing the long-term strategy for the taconite facilities, including United, is their demonstration that their facilities are in attainment with the one-hour National Ambient Air Quality Standards (NAAQS) for SO<sub>2</sub> [40 CFR § 50.17] and nitrogen dioxide (NO<sub>2</sub>) [ 40 CFR § 50.11]. As a result, United must model compliance with the one-hour and SO<sub>2</sub> and NO<sub>2</sub> NAAQS. This Order establishes the tasks and schedules by which the modeling for United will be completed.

### **ORDER**

# NOW, THEREFORE, IT IS ORDERED AND AGREED:

- 19. United will install and operate any necessary control equipment or undertake any necessary work practices to meet the following requirements which represent BART for United.
- I. BART Emission Limitations and Compliance Methods
  - a. BART for Nitrogen Oxides (NO<sub>x</sub>)
    - i. Emission Limitations
      - 1.  $NO_X$  emissions from EU040 shall not exceed 4.5 tons per day at all times when EU040 is operating, measured on a 30-day rolling average; and
      - 2. NO<sub>x</sub> emissions from EU042 shall not exceed 10.1 tons per day at all times when EU042 is operating, measured on a 30-day rolling average.

- Hours during which the subject emission unit does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
- 4. The NO<sub>x</sub> emission limit is effective on and after the date six months after the effective date of U.S. EPA's approval of United's BART determination.
- ii. Compliance with the NO<sub>X</sub> emission limit above will be demonstrated through the use of continuous emission monitoring systems (CEMS) in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220.
- b. BART for Sulfur Dioxide (SO<sub>2</sub>)
  - i. Emission Limitations
    - 1.  $SO_2$  emissions from EU040 shall not exceed 106.3 tons over 30 days, measured as a 30-day rolling sum, at all times when EU040 is operating; and
    - SO<sub>2</sub> emissions from EU042 shall not exceed 197 tons over 30 days, measured as a 30-day rolling sum, at all times when EU 042 is operating.
    - Hours during which the subject emission unit does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling sum
    - 4. The SO<sub>2</sub> emission limit is effective on and after the date six months after the effective date of U.S. EPA's approval of United's BART determination.
  - ii. Compliance with the SO<sub>2</sub> emission limit above will be determined through the use of continuous emission monitoring systems (CEMS) in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220.
- c. BART for Particulate Matter (PM)
  - i. Emission Limitations
    - 1. Filterable (front-half) PM emissions from each line shall not exceed 0.01 gr/dscf.
  - ii. Compliance with the PM emission limits above will be determined using the compliance methods laid out in 40 CFR § 63 Subpart RRRRR, the taconite MACT, and determined based on the flow weighted mean concentration of all stacks for the furnace.
  - iii. Compliance with the PM emission limit must be demonstrated based on the timelines laid out in the taconite MACT.

## II. Recordkeeping and Reporting

- a. Recordkeeping. United shall maintain electronic files of all information required by this Order in a form suitable for determination of United's compliance with this Order by U.S. EPA or MPCA staff and readily available for U.S. EPA or MPCA inspection and review.
  - i. Permanent Records: United shall permanently maintain the following information together with all amendments, revisions, and modifications to this information.
    - 1. Information on NO<sub>X</sub>, SO<sub>2</sub>, and PM emission limits and operational requirements imposed by this Order. These records include this Order.
  - ii. Non Permanent Records: United shall maintain monitoring, testing, startup, shutdown, bypass, breakdowns, excess emissions and noncompliance with operational requirements records pertaining to the requirements of this Order in the manner required in the total Facility requirements of United's air emissions permit, pursuant to Minn. R. 7007.0800. United shall retain the records for a minimum of five years following the date on which the record was generated. The most recent two years of information must be kept on site.
- b. United shall, in the Semiannual Deviations Report required under Minn. R. 7007.0800, Subp. 6(A)(2), report each instance in which an emission limit was not met. This includes periods of startup, shutdown, and malfunction.
- 20. To conduct the following modeling analyses and submit the following information in order to ensure expeditious attainment of the one-hour  $SO_2$  and  $NO_2$  NAAQS as part of the long-term strategy

# I. Modeling Protocol

- a. By April 1, 2012, submit to the MPCA a modeling protocol for the United facility for NO<sub>2</sub> emissions. The protocol must be submitted using MPCA's most recent model protocol forms, AQDMP-01 and AQDMPS-01.
- II. Modeling and Emission Limits Demonstrating Compliance
  - a. By December 15, 2012, submit to the MPCA:
    - i. A modeling demonstration that shows modeled compliance with the one-hour SO<sub>2</sub> NAAQS and one-hour NO<sub>2</sub> NAAQS;
    - ii. A table of proposed emission limits from the facility, by emission unit and stack vent, that result in modeled compliance with the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS;
    - iii. A description of the work practices or controls to be implemented in order to meet the proposed emission limits; and
    - iv. A detailed schedule for implementation of the necessary work practices or controls which ensures that they will be in place and the emission limits achieved by June 30, 2017.

# General.

- 21. This Order by Consent is not transferable or assignable to any person without the express written approval of the MPCA.
- 22. This Order by Consent is effective upon the date that it is signed by the MPCA Commissioner or his designee.

# **RESERVATION OF AUTHORITY**

Nothing in this Order shall prevent the MPCA from taking action to enforce the requirements of this Order, or from requiring additional action by the Regulated Party if necessary to ensure compliance with the Regional Haze rule and other MPCA rules and statutes.

IT IS SO ORDERED.

**Minnesota Pollution Control Agency** 

Paul W. Aasen Commissioner

# STATE OF MINNESOTA Minnesota Pollution Control Agency

In the Matter of: United States Steel Corporation Keewatin Taconite, Inc. **ADMINISTRATIVE ORDER BY CONSENT** 

The Minnesota Pollution Control Agency (MPCA) and United States Steel Corporation Keewatin Taconite, Inc. (Keetac) enter into this Administrative Order by Consent (Order) pursuant to Minn. Stat. § 116.07, subd. 9 (2010).

### **FINDINGS OF FACT**

# **BACKGROUND**

- On July 6, 2005, the U.S. Environmental Protection Agency (U.S. EPA) published regulations to address visibility impairment in our nation's largest national parks and wilderness ("Class I") areas [70 Fed. Reg. 39103]. This rule is commonly known as the "Regional Haze Rule" [40 CFR §§ 51.300-51.309]. The Regional Haze Rule (Rule) requires that Minnesota establish and achieve visibility goals for each of its mandatory Class I areas by 2018.
- 2. The Rule regulates the emission of pollutants that contribute to regional haze. The MPCA has determined that the key pollutants contributing to regional haze are particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), and nitrogen oxides (NO<sub>X</sub>).
- 3. The Rule requires that Minnesota submit a Regional Haze State Implementation Plan (SIP) to U.S. EPA for its approval. The SIP must include:
  - a. Reasonable Progress Goals Minnesota must establish, for each Class I area within the state, "goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions." [40 CFR § 51.308(d)(1)].
  - b. Long-Term Strategy Minnesota must submit a long-term strategy that addresses regional haze visibility impairment, and includes "measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas." [40 CFR § 51.308(d)(3)].
  - c. Best Available Retrofit Technology The Rule regulates certain stationary sources that could contribute to visibility impairment in Class I areas. States, including Minnesota, must determine what constitutes the best available retrofit technology (BART) to control for PM, SO<sub>2</sub>, and NO<sub>X</sub> and to establish emissions limits that are consistent with BART for these sources. The limits must be included in the SIP for U.S. EPA approval.
- 4. The MPCA submitted a Regional Haze SIP to U.S. EPA on December 30, 2009, which included the required Reasonable Progress Goals and Long-Term Strategy and identified the BART-eligible and subject-to-BART sources, listed the MPCA's BART determinations, and included associated BART emission limits where MPCA had sufficient emissions data to set such limits. On April 1, 2010, U.S. EPA notified the MPCA that the submittal was complete.

- Subsequently, MPCA prepared a supplemental SIP submittal that revised the long-term strategy and included BART emission limits where additional data had been collected. The supplemental SIP submittal also included this Order and supporting documents.
- 6. On <December 19, 2011>, the MPCA put its proposed supplemental SIP submittal on public notice for 45 days. <CITATION.> The public comment period provided Keetac and members of the general public an opportunity to comment on this Order and the other elements of the proposed supplemental SIP, including the BART emission limits, prior to U.S. EPA's final decision on the SIP.

# **THE FACILITY**

- 7. United States Steel Corporation Keewatin Taconite, Inc. (Keetac) owns and operates a taconite mine and processing facility ("Facility") in Keewatin, Minnesota. Keetac is authorized to operate two grate-kiln furnaces (EU030 and EU068/EU069/EU070). EU030 was constructed in 1976. The furnace is capable of processing 415 tons of pellets per hour with a heat input of 178.5 MM8tu/hr. Keetac was authorized to reconstruct and operate EU068/EU069/EU070 by a permit amendment that the MPCA issued on September 14, 2011. EU068/EU069/EU070 are not yet operational.
- 8. The permit allows Keetac to combust natural gas, distillate fuel oils, coal, and petroleum coke in the EU030 pelletizing furnace. Coal and natural gas are the primary fuels; coal is a significant source of sulfur. Another source of sulfur emissions from this furnace is the iron ore used to form the taconite green balls, although this represents a smaller contribution than the sulfur in the solid fuels burned. Sulfur dioxide emissions are currently controlled by wet scrubbers.

# **BEST AVAILABLE RETROFIT TECHNOLOGY (BART)**

- 9. The Rule includes 40 CFR 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which sources may need to install BART and for determining BART.
- 10. To satisfy the Rule, the MPCA determined what constitutes BART for each BART-eligible unit and established emission limits consistent with its determination of BART. As required, the MPCA took into consideration the technology available, the costs of compliance, the energy and the non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. [40 CFR § 51.308(e)(ii)].
- 11. To identify the BART-eligible emission units, MPCA used the following criteria:
  - a. One, or more, emission(s) units at the facility fit within one of the twenty-six (26) categories listed in the 40 CFR 51, Appendix Y *Guidelines*;
  - b. The emission unit(s) were in existence on August 7, 1977 and began operation at some point on or after August 7, 1962; and
  - c. The sum of the potential emissions from all emission unit(s) identified in the previous two bullets was greater than 250 tons per year of the visibility-impairing pollutants: SO<sub>2</sub>, NO<sub>x</sub>, and PM.

- 12. The Keetac facility includes one unit (EU030) that is subject to BART. See RESULTS of Best Available Retrofit Technology (BART) Modeling to Determine Sources Subject-to-BART in the State of Minnesota at http://proteus.pca.state.mn.us/publications/aq-sip2-07.pdf.
- 13. Keetac's EU030 Grate-Kiln pelletizing furnace was determined to be subject-to-BART, and US Steel performed a BART analysis for it. This unit has one associated stack vent, SV051.
- 14. MPCA determined and US Steel agreed that the Keetac Grate-Kiln pelletizing furnace (EU030) is subject-to-BART.
- 15. The MPCA determined that BART for this unit consists of
  - a. Operation of the existing wet scrubber to control SO<sub>2</sub> emissions; and
  - b. Good combustion practices, along with existing combustion controls and fuel blending to control NO<sub>x</sub> emissions; and
  - c. Implementation of the taconite Maximum Achievable Control Technology (MACT) standard to control PM emissions. [40 CFR 63, Subp. RRRRR].
- 16. The MPCA must place BART emission limits in an enforceable document. [40 CFR § 51.302 (c)(3); 40 CFR § 51.308(e)((1)(iv)]. The MPCA has chosen to issue this Administrative Order as the enforceable document by which to establish the BART emission limit for Keetac.

### LONG-TERM STRATEGY

- 17. In the SIP, the MPCA established, as part of the long-term strategy, a target or goal of a reduction in combined  $SO_2$  and  $NO_X$  emissions from large point sources located in St. Louis, Lake, Cook, Carlton, Itasca and Koochiching counties that emitted over 100 tons per year of either  $SO_2$  or  $NO_X$  in 2002.
- 18. The MPCA also determined that the six taconite facilities in Minnesota may be undercontrolled, and that very few emission control technologies are known to be effective for the industrial processes involved in taconite production. The MPCA therefore also established a requirement for these facilities to investigate control technologies and pollution prevention practices for their indurating furnaces as part of the long-term strategy.
- 19. The MPCA has determined that an appropriate mechanism for implementing the long-term strategy for the taconite facilities, including Keetac, is their demonstration that their facilities are in attainment with the one-hour National Ambient Air Quality Standards (NAAQS) for SO<sub>2</sub> [40 CFR § 50.17] and nitrogen dioxide (NO<sub>2</sub>) [ 40 CFR § 50.11]. As a result, Keetac must model compliance with the one-hour and SO<sub>2</sub> and NO<sub>2</sub> NAAQS. This Order establishes the tasks and schedules by which the modeling for Keetac will be completed.

## <u>ORDER</u>

## NOW, THEREFORE, IT IS ORDERED AND AGREED:

20. Keetac will install and operate any necessary control equipment or undertake any necessary work practices to meet the following requirements which represent BART for Keetac.

# BART Emission Limitations and Compliance Methods

- a. BART for Nitrogen Oxides (NO<sub>x</sub>)
  - i. Emission Limitations
    - 1.  $NO_X$  emissions from EU030 shall not exceed 12.35 tons per day at all times when EU030 is operating, measured on a 30-day rolling average.
    - Hours during which EU030 does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
    - 3. The NO<sub>X</sub> emission limit is effective on and after the date six months after the effective date of U.S. EPA's approval of Keetac's BART determination.
  - ii. Compliance with the  $NO_X$  emission limit above will be demonstrated through the use of continuous emission monitoring systems (CEMS) in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220.
- BART for Sulfur Dioxide (SO<sub>2</sub>)
  - i. Emission Limitations
    - 1.  $SO_2$  emissions from EU030 shall not exceed 2.71 tons per day at all times when EU030 is operating, measured on a 30-day rolling average basis.
    - 2. Hours during which EU030 does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
    - 3. The SO<sub>2</sub> emission limit is effective on and after the date six months after the effective date of U.S. EPA's approval of Keetac's BART determination.
  - Compliance with the SO<sub>2</sub> emission limit above will be determined through the use of continuous emission monitoring systems (CEMS) in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220.
- c. BART for Particulate Matter (PM)
  - i. Emission Limitations
    - 1. Filterable (front-half) PM emissions from EU030 shall not exceed 0.01 gr/dscf.
  - ii. Compliance with the PM emission limits above will be determined using the compliance methods laid out in 40 CFR 63 Subpart RRRRR, the taconite MACT, and determined based on the flow weighted mean concentration of all stacks for the furnace.

- iii. Compliance with the PM emission limit must be demonstrated based on the timelines laid out in the taconite MACT.
- II. Recordkeeping and Reporting
  - a. Recordkeeping. Keetac shall maintain electronic files of all information required by this
    Order in a form suitable for determination of Keetac's compliance with this Order by U.S.
    EPA or MPCA staff and readily available for U.S. EPA or MPCA inspection and review.
    - i. Permanent Records: Keetac shall permanently maintain the following information together with all amendments, revisions, and modifications to this information.
      - 1. Information on NO<sub>X</sub>, SO<sub>2</sub>, and PM emission limits and operational requirements imposed by this Order. These records include this Order.
    - ii. Non Permanent Records: Keetac shall maintain monitoring, testing, startup, shutdown, bypass, breakdowns, excess emissions and noncompliance with operational requirements records pertaining to the requirements of this Order in the manner required in the total Facility requirements of Keetac's air emissions permit, pursuant to Minn. R. 7007.0800 and. Keetac shall retain the records for a minimum of five years following the date on which the record was generated. The most recent two years of information must be kept on site.
  - b. Keetac shall, in the Semiannual Deviations Report required under Minn. R. 7007.0800, Subp. 6(A)(2), report each instance in which an emission limit was not met. This includes periods of startup, shutdown, and malfunction.
- 21. To conduct the following modeling analyses and submit the following information in order to ensure expeditious attainment of the one-hour  $SO_2$  and  $NO_2$  NAAQS as part of the long-term strategy
- I. Modeling and Emission Limits Demonstrating Compliance
  - a. By December 15, 2012, submit to the MPCA:
    - i. A modeling demonstration that shows modeled compliance with the one-hour SO<sub>2</sub> NAAQS and one-hour NO<sub>2</sub> NAAQS;
    - ii. A table of proposed emission limits from the facility, by emission unit and stack vent, that result in modeled compliance with the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS;
    - iii. A description of the work practices or controls to be implemented in order to meet the proposed emission limits; and
    - iv. A detailed schedule for implementation of the necessary work practices or controls which ensures that they will be in place and the emission limits achieved by June 30, 2017.

### General.

- 22. Nothing in this Order shall relieve Keetac of its obligation to meet permitting requirements for any physical or operational change at its facility.
- 23. This Order by Consent supersedes and replaces the Administrative Order by Consent entered into by Keetac and the MPCA on September 27, 2007.
- 24. This Order by Consent is not transferable or assignable to any person without the express written approval of the MPCA.
- 25. This Order by Consent is effective upon the date that it is signed by the MPCA Commissioner or his designee.
- 26. The terms of this Order by Consent may be amended by the written agreement of the parties.

# **RESERVATION OF AUTHORITY**

Nothing in this Order shall prevent the MPCA from taking action to enforce the requirements of this Order, or from requiring additional action by the Regulated Party if necessary to ensure compliance with the Regional Haze rule and other MPCA rules and statutes.

IT IS SO ORDERED.

United States Steel Corporation, Keewatin Taconite, Inc.

Minnesota Pollution Control Agency

Michael S. Williams
Senior Vice President - North America Flat Roll
Operations
United States Steel Corporation

Paul W. Aasen Commissioner

# STATE OF MINNESOTA Minnesota Pollution Control Agency

In the Matter of: United States Steel Corporation Minntac **ADMINISTRATIVE ORDER BY CONSENT** 

The Minnesota Pollution Control Agency (MPCA) and United States Steel Corporation, Minntac (Minntac) enter into this Administrative Order (Order) pursuant to Minn. Stat. § 116.07, subd. 9 (2010).

### FINDINGS OF FACT

# **BACKGROUND**

- On July 6, 2005, the U.S. Environmental Protection Agency (U.S. EPA) published regulations to address visibility impairment in our nation's largest national parks and wilderness ("Class I") areas [70 Fed. Reg. 39103]. This rule is commonly known as the "Regional Haze Rule" [40 CFR §§ 51.300-51.309]. The Regional Haze Rule (Rule) requires that Minnesota establish and achieve visibility goals for each of its mandatory Class I areas by 2018.
- 2. The Rule regulates the emission of pollutants that contribute to regional haze. The MPCA has determined that the key pollutants contributing to regional haze are particulate matter (PM), sulfur dioxide (SO<sub>2</sub>), and nitrogen oxides (NO<sub>x</sub>).
- 3. The Rule requires that Minnesota submit a Regional Haze State Implementation Plan (SIP) to U.S. EPA for its approval. The SIP must include:
  - a. Reasonable Progress Goals Minnesota must establish, for each Class I area within the state, "goals (expressed in deciviews) that provide for reasonable progress towards achieving natural visibility conditions." [40 CFR § 51.308(d)(1)].
  - b. Long-Term Strategy Minnesota must submit a long-term strategy that addresses regional haze visibility impairment, and includes "measures as necessary to achieve the reasonable progress goals established by States having mandatory Class I Federal areas." [40 CFR § 51.308(d)(3)].
  - c. Best Available Retrofit Technology The Rule regulates certain stationary sources that could contribute to visibility impairment in Class I areas. States, including Minnesota, must determine what constitutes the best available retrofit technology (BART) to control for PM, SO<sub>2</sub>, and NO<sub>X</sub> and to establish emissions limits that are consistent with BART for these sources. The limits must be included in the SIP for U.S. EPA approval.
- 4. The MPCA submitted a Regional Haze SIP to U.S. EPA on December 30, 2009, which included the required Reasonable Progress Goals and Long-Term Strategy and identified the BART-eligible and subject-to-BART sources, listed the MPCA's BART determinations, and included associated BART emission limits where MPCA had sufficient emissions data to set such limits. On April 1, 2010, U.S. EPA notified the MPCA that the submittal was complete.
- 5. Subsequently, MPCA prepared a supplemental SIP submittal that revised the long-term strategy and included BART emission limits where additional data had been collected. The supplemental SIP submittal also included this Order and supporting documents.

6. On <December 19, 2011>, the MPCA put its proposed supplemental SIP submittal on public notice for 45 days. <CITATION.> The public comment period provided Minntac and members of the general public an opportunity to comment on this Order and the other elements of the proposed supplemental SIP, including the BART emission limits, prior to U.S. EPA's final decision on the SIP.

# THE FACILITY

- 7. United States Steel Minntac (Minntac) owns and operates a taconite mine and processing facility ("Facility") at County Highway 102, on the Mesabi Range north of the City of Mountain Iron, St. Louis County, Minnesota.
- 8. Minntac operates five indurating furnaces (Lines 3, 4, 5, 6, and 7). Line 3 (Step I) began operation in 1967; Lines 4 and 5 (Step II) began operation in 1972; and Lines 6 and 7 (Step III) began operation in 1978.

### **BEST AVAILABLE RETROFIT TECHNOLOGY (BART)**

- The Rule includes 40 CFR 51, Appendix Y "Guidelines for BART Determinations Under the Regional Haze Rule" which provides direction for determining which sources may need to install BART and for determining BART.
- 10. To satisfy the Rule, the MPCA determined what constitutes BART for each BART-eligible unit and established emission limits consistent with its determination of BART. As required, the MPCA took into consideration the technology available, the costs of compliance, the energy and the non-air quality environmental impacts of compliance, any pollution control equipment in use or in existence at the source, the remaining useful life of the source, and the degree of improvement in visibility which may reasonably be anticipated to result from the use of such technology. [40 CFR § 51.308(e)(ii)].
- 11. To identify the BART-eligible emission units, MPCA used the following criteria:
  - a. One, or more, emission(s) units at the facility fit within one of the twenty-six (26) categories listed in the 40 CFR 51, Appendix Y *Guidelines*;
  - b. The emission unit(s) were in existence on August 7, 1977 and began operation at some point on or after August 7, 1962; and
  - c. The sum of the potential emissions from all emission unit(s) identified in the previous two bullets was greater than 250 tons per year of the visibility-impairing pollutants: SO<sub>2</sub>, NO<sub>x</sub>, and PM.

- 12. Minntac includes units that are subject to BART. See <u>RESULTS of Best Available Retrofit Technology</u> (BART) Modeling to Determine Sources Subject-to-BART in the State of Minnesota at <a href="http://proteus.pca.state.mn.us/publications/aq-sip2-07.pdf">http://proteus.pca.state.mn.us/publications/aq-sip2-07.pdf</a>.
- 13. Minntac has five units, the indurating furnaces identified as Emission Units 225, 261, 282, 315, and 334 in Air Emissions Permit No. 13700005-005, that are subject-to-BART and for which a BART analysis was performed. The stack vent associated with EU225, the Line 3 indurating furnace, is SV103. The stack vent associated with EU261, the Line 4 indurating furnace, is SV118. The stack vent associated with EU282, the Line 5 indurating furnace, is SV127. The stack vent associated with EU315, the Line 6 indurating furnace, is SV144. The stack vent associated with EU334, the Line7 indurating furnace, is SV151.
- MPCA determined and US Steel agreed that Minntac's five indurating furnaces (EU225, EU261, EU282, EU315, and EU334) are subject-to-BART
- 15. The MPCA determined that BART for these units consists of:
  - a. Operation of the existing wet scrubber to control SO<sub>2</sub> emissions; and
  - b. Good combustion practices and fuel blending to control  $NO_X$  emissions for Lines 3, 4, 5, 6, and 7, with the addition of low- $NO_X$  burners in the pre-heat zone for Lines 4, 5, 6, and 7; and
  - c. Implementation of the taconite Maximum Achievable Control Technology (MACT) standard to control PM emissions. 40 CFR 63, Subp. RRRRR.
- 16. The MPCA must place BART emission limits in an enforceable document. [40 CFR § 51.302 (c)(3); 40 CFR § 51.308(e)((1)(iv)]. The MPCA has chosen to issue this Administrative Order as the enforceable document by which to establish the BART emission limit for Minntac.

# **LONG-TERM STRATEGY**

- 17. In the SIP, the MPCA established, as part of the long-term strategy, a target or goal of a reduction in combined SO<sub>2</sub> and NO<sub>X</sub> emissions from large point sources located in St. Louis, Lake, Cook, Carlton, Itasca and Koochiching counties that emitted over 100 tons per year of either SO<sub>2</sub> or NO<sub>X</sub> in 2002.
- 18. The MPCA also determined that the six taconite facilities in Minnesota may be undercontrolled, and that very few emission control technologies are known to be effective for the industrial processes involved in taconite production. The MPCA therefore also established a requirement for these facilities to investigate control technologies and pollution prevention practices for their indurating furnaces as part of the long-term strategy.
- 19. The MPCA has determined that an appropriate mechanism for implementing the long-term strategy for the taconite facilities, including Minntac, is their demonstration that their facilities are in attainment with the one-hour National Ambient Air Quality Standards (NAAQS) for SO<sub>2</sub> [40 CFR § 50.17] and nitrogen dioxide (NO<sub>2</sub>) [40 CFR § 50.11]. As a result, Minntac must model compliance with the one-hour and SO<sub>2</sub> and NO<sub>2</sub> NAAQS. This Order establishes the tasks and schedules by which the modeling for Minntac will be completed.

# **ORDER**

# NOW, THEREFORE, IT IS ORDERED AND AGREED:

- 20. Minntac will install and operate any necessary control equipment or undertake any necessary work practices to meet the following requirements, which represent BART for Minntac.
- I. BART Emission Limitations and Compliance Methods
  - a. BART for Nitrogen Oxides (NO<sub>x</sub>)
    - i. Emission Limitations
      - 1. NO<sub>X</sub> emissions from Line 3, EU225, shall not exceed 7.85 tons per day at all times when EU225 is operating, measured on a 30-day rolling average;
      - 2. NO<sub>X</sub> emissions from Line 4, EU261, shall not exceed 9.85 tons per day at all times when EU261 is operating, measured on a 30-day rolling average;
      - 3. NO<sub>x</sub> emissions from Line 5, EU282, shall not exceed 9.46 tons per day at all times when EU282 is operating, measured on a 30-day rolling average;
      - 4. NO<sub>x</sub> emissions from Line 6, EU315, shall not exceed 7.14 tons per day at all times when EU315 is operating, measured on a 30-day rolling average;
      - 5. NO<sub>X</sub> emissions from Line 7, EU334, shall not exceed 5.51 tons per day at all times when EU334 is operating, measured on a 30-day rolling average.
      - Hours during which the subject emission unit does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
      - These NO<sub>X</sub> emission limits are effective on and after the date six months
        after the effective date of U.S. EPA's approval of this BART determination.
    - ii. Compliance with the  $NO_X$  emission limits above will be demonstrated through the use of continuous emission monitoring systems (CEMS) in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220.
  - b. BART for Sulfur Dioxide (SO<sub>2</sub>)
    - i. Emission Limitations
      - SO<sub>2</sub> emissions from Line 3, EU225, shall not exceed 1.28 tons per day at all times when EU225 is operating, measured on a 30-day rolling average. This limit applies only when the line is burning natural gas or wood;

- 2. SO<sub>2</sub> emissions from Line 4, EU261, shall not exceed 1.10 tons per day at all times when EU261 is operating, measured on a 30-day rolling average. This limit applies only when the line is burning natural gas or wood;
- SO<sub>2</sub> emissions from Line 5, EU282, shall not exceed 1.19 tons per day at all times when EU282 is operating, measured on a 30-day rolling average. This limit applies only when the line is burning natural gas or wood;
- 4. SO<sub>2</sub> emissions from Line 6, EU315, shall not exceed 1.47 tons per day at all times when EU315 is operating, measured on a 30-day rolling average;
- 5. SO<sub>2</sub> emissions from Line 7, EU334, shall not exceed 1.61 tons per day at all times when EU334 is operating, measured on a 30-day rolling average.
- Hours during which the subject emission unit does not operate are not included in the calculation of the rolling average. Periods of startup, shutdown and malfunction are included in the calculation of the rolling average.
- 7. These SO<sub>2</sub> emission limits are effective on and after the date six months after the effective date of U.S. EPA's approval of this BART determination.
- ii. Compliance with the  $SO_2$  emission limits above will be determined through the use of continuous emission monitoring systems (CEMS) in accordance with Minn. R. 7017.1002 through Minn. R. 7017.1220.
- c. BART for Particulate Matter (PM)
  - i. Emission Limitations
    - 1. Filterable (front-half) PM emissions from each line shall not exceed 0.01 gr/dscf
  - ii. Compliance with the PM emission limits above will be determined using the compliance methods laid out in 40 CFR 63 Subpart RRRRR, the taconite MACT, and determined based on the flow weighted mean concentration of all stacks for each furnace.
  - iii. Compliance with the PM emission limit must be demonstrated based on the timelines laid out in the taconite MACT.
- II. Recordkeeping and Reporting
  - a. Recordkeeping. Minntac shall maintain electronic files of all information required by this Order in a form suitable for determination of Minntac's compliance with this Order by U.S. EPA or MPCA staff and readily available for U.S. EPA or MPCA inspection and review.
    - i. Permanent Records: Minntac shall permanently maintain the following information together with all amendments, revisions, and modifications to this information.

- 1. Information on NO<sub>X</sub>, SO<sub>2</sub>, and PM emission limits and operational requirements imposed by this Order. These records include this Order.
- ii. Non Permanent Records: Minntac shall maintain monitoring, testing, startup, shutdown, bypass, breakdowns, excess emissions and noncompliance with operational requirements records pertaining to the requirements of this Order in the manner required in the total Facility requirements of Minntac's air emissions permit, pursuant to Minn. R. 7007.0800 and. Minntac shall retain the records for a minimum of five years following the date on which the record was generated. The most recent two years of information must be kept on site.
- b. Minntac shall, in the Semiannual Deviations Report required under Minn. R. 7007.0800, Subp. 6(A)(2), report each instance in which an emission limit was not met. This includes periods of startup, shutdown, and malfunction.
- 21. To conduct the following modeling analyses and submit the following information in order to ensure expeditious attainment of the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS as part of the long-term strategy
- I. Modeling and Emission Limits Demonstrating Compliance
  - a. By December 15, 2012, submit to the MPCA:
    - i. A modeling demonstration that shows modeled compliance with the one-hour SO<sub>2</sub>
       NAAQS and one-hour NO<sub>2</sub> NAAQS;
    - ii. A table of proposed emission limits from the facility, by emission unit and stack vent, that result in modeled compliance with the one-hour SO<sub>2</sub> and NO<sub>2</sub> NAAQS;
    - iii. A description of the work practices or controls to be implemented in order to meet the proposed emission limits; and
    - iv. A detailed schedule for implementation of the necessary work practices or controls which ensures that they will be in place and the emission limits achieved by June 30, 2017.

# General.

- 22. Nothing in this Order shall relieve Minntac of its obligation to meet permitting requirements for any physical or operational change at its facility.
- 23. This Order by Consent supersedes and replaces the Administrative Order by Consent entered into by Minntac and the MPCA on September 27, 2007.
- 24. This Order by Consent is not transferable or assignable to any person without the express written approval of the MPCA.
- 25. This Order by Consent is effective upon the date that it is signed by the MPCA Commissioner or his designee.

# -DRAFT-

26. The terms of this Order by Consent may be amended by the written agreement of the parties.

# **RESERVATION OF AUTHORITY**

Nothing in this Order shall prevent the MPCA from taking action to enforce the requirements of this Order, or from requiring additional action by the Regulated Party if necessary to ensure compliance with the Regional Haze rule and other MPCA rules and statutes.

United States Steel Corporation, Minntac

**Minnesota Pollution Control Agency** 

Michael S. Williams Senior Vice President - North America Flat Roll Operations United States Steel Corporation Paul W. Aasen Commissioner

# Appendix 3: Termination of Monitoring Orders

# STATE OF MINNESOTA Minnesota Pollution Control Agency

In the Matter of:
ArcelorMittal – Minorca Mine Inc.

AMENDMENT NO. 1 TO ADMINISTRATIVE ORDER BY CONSENT

# I. RECITALS

- A. PARTIES. This Amendment Number 1 applies to and is binding upon the following parties:
  - ArcelorMittal Minorca Mine, Inc. ("Regulated Party")
  - 2. The Minnesota Pollution control Agency ("MPCA")

Unless specified otherwise in this amendment Nol. 1, where this Amendment No. 1 identifies actions to be taken by the MPCA, the Commissioner or the Commissioner's designees shall act on the MPCA's behalf.

- B. ADMINISTRATIVE ORDER BY CONSENT. The MPCA and the Regulated Party have entered into an Administrative Order by Consent ("Order") regarding the Regulated Party's facility located near Virginia, Minnesota. The effective date of the Order was January 22, 2009.
- C. STATEMENT OF THE FACTS. The following constitutes a summary of the facts upon which this Amendment No. 1 is based:
- By its terms, the Order was to remain in effect until BART-related terms and conditions
  of the Order became enforceable parts of the Regulated Party's air emissions permit.
- 2. The terms and conditions of the Order have been satisfied so it is not necessary to include Bart-related terms and conditions of the Order in the Regulated party's air emissions permit, nor is it necessary to continue the Order in effect.

## **II. AGREEMENT AMENDMENT**

NOW THEREFORE, pursuant to paragraph 16 of the Order, the MPCA and Regulated Party hereby agree to amend the Order to terminate it effective upon the date of the signature of the Commissioner of the MPCA or the Commissioner's representative below.

# BY THEIR SIGNATURES BELOW, THE UNDERSIGNED REPRESENT THAT THEY HAVE AUTHORITY TO AMEND THE ORIGINAL AGREMENT AND THAT THEY AGREE WITH THIS AMENDMENT AS WRITTEN

ARCELORMITTAL - MINORCA MINE INC.	STATE OF MINNESOTA POLLUTION CONTROL AGENCY		
Jonathon Holmes	Jeff J. Smith		
Vice President/Operations Manager	Division Director		
ArcelorMittal Minorca Mine Inc	Industrial Division		
Dated:	Dated:		

# STATE OF MINNESOTA Minnesota Pollution Control Agency

In the Matter of: Hibbing Taconite Company AMENDMENT NO. 1 TO ADMINISTRATIVE ORDER BY CONSENT

# i. RECITALS

- A. PARTIES. This Amendment Number 1 applies to and is binding upon the following parties:
  - 1. Hibbing Taconite Company ("Regulated Party")
  - 2. The Minnesota Pollution control Agency ("MPCA")

Unless specified otherwise in this amendment Nol. 1, where this Amendment No. 1 identifies actions to be taken by the MPCA, the Commissioner or the Commissioner's designees shall act on the MPCA's behalf.

- **B. ADMINISTRATIVE ORDER BY CONSENT.** The MPCA and the Regulated Party have entered into an Administrative Order by Consent ("Order") regarding the Regulated Party's facility located in Hibbing, Minnesota. The effective date of the Order was March 3, 2008.
- C. STATEMENT OF THE FACTS. The following constitutes a summary of the facts upon which this Amendment No. 1 is based:
- 1. By its terms, the Order was to remain in effect until BART-related terms and conditions of the Order became enforceable parts of the Regulated Party's air emissions permit.
- 2. The terms and conditions of the Order have been satisfied so it is not necessary to include BART-related terms and conditions of the Order in the Regulated party's air emissions permit, nor is it necessary to continue the Order in effect.

## II. AGREEMENT AMENDMENT

NOW THEREFORE, pursuant to paragraph 16 of the Order, the MPCA and Regulated Party hereby agree to amend the Order to terminate it effective upon the date of the signature of the Commissioner of the MPCA or the Commissioner's representative below.

# BY THEIR SIGNATURES BELOW, THE UNDERSIGNED REPRESENT THAT THEY HAVE AUTHORITY TO AMEND THE ORIGINAL AGREMENT AND THAT THEY AGREE WITH THIS AMENDMENT AS WRITTEN

HIBBING TACONTTE COMPANY	POLLUTION CONTROL AGENCY		
Edward M. LaTendresse	Jeff J. Smith		
General Manager	Division Director		
Hibbing Taconite Company	Industrial Division		
Dated:	Dated:		

# STATE OF MINNESOTA Minnesota Pollution Control Agency

In the Matter of: Northshore Mining Company – Silver Bay AMENDMENT NO. 1 TO ADMINISTRATIVE ORDER BY CONSENT

# I. RECITALS

- A. PARTIES. This Amendment Number 1 applies to and is binding upon the following parties:
  - 1. Northshore Mining Company Silver Bay ("Regulated Party")
  - 2. The Minnesota Pollution control Agency ("MPCA")

Unless specified otherwise in this amendment Nol. 1, where this Amendment No. 1 identifies actions to be taken by the MPCA, the Commissioner or the Commissioner's designees shall act on the MPCA's behalf.

- B. ADMINISTRATIVE ORDER BY CONSENT. The MPCA and the Regulated Party have entered into an Administrative Order by Consent ("Order") regarding the Regulated Party's facility located in Silver Bay, Minnesota. The effective date of the Order was April 7, 2008.
- C. STATEMENT OF THE FACTS. The following constitutes a summary of the facts upon which this Amendment No. 1 is based:
- By its terms, the Order was to remain in effect until BART-related terms and conditions
   of the Order became enforceable parts of the Regulated Party's air emissions permit.
- The terms and conditions of the Order have been satisfied so it is not necessary to
  include Bart-related terms and conditions of the Order in the Regulated party's air emissions permit, nor
  is it necessary to continue the Order in effect.

### **II. AGREEMENT AMENDMENT**

NOW THEREFORE, pursuant to paragraph 16 of the Order, the MPCA and Regulated Party hereby agree to amend the Order to terminate it effective upon the date of the signature of the Commissioner of the MPCA or the Commissioner's representative below.

# BY THEIR SIGNATURES BELOW, THE UNDERSIGNED REPRESENT THAT THEY HAVE AUTHORITY TO AMEND THE ORIGINAL AGREMENT AND THAT THEY AGREE WITH THIS AMENDMENT AS WRITTEN

NORTHSHORE MINING COMPANY - SILVER BAY	STATE OF MINNESOTA POLLUTION CONTROL AGENCY		
Mike Mlinar	Jeff J. Smith		
Vice President/General Manager	Division Director		
Northshore Mining Company	Industrial Division		
Dated:	Dated:		

# STATE OF MINNESOTA Minnesota Pollution Control Agency

In the Matter of: United Taconite, LLC AMENDMENT NO. 1 TO AMENDED ADMINISTRATIVE ORDER BY CONSENT

## I. RECITALS

A. PARTIES. This Amendment Number 1 applies to and is binding upon the following parties:

The Minnesota Pollution control Agency ("MPCA")

- 1. United Taconite, LLC. ("Regulated Party")
- Unless specified otherwise in this amendment Nol. 1, where this Amendment No. 1 identifies actions to be taken by the MPCA, the Commissioner or the Commissioner's designees shall act on the MPCA's behalf.
- B. ADMINISTRATIVE ORDER BY CONSENT. The MPCA and the Regulated Party have entered into an Administrative Order by Consent ("Order") regarding the Regulated Party's facility located near Forbes, Minnesota. The effective date of the Order was May 18, 2009.
- C. STATEMENT OF THE FACTS. The following constitutes a summary of the facts upon which this Amendment No. 1 is based:
- By its terms, the Order was to remain in effect until BART-related terms and conditions
  of the Order became enforceable parts of the Regulated Party's air emissions permit.
- 2. The terms and conditions of the Order have been satisfied so it is not necessary to include BART-related terms and conditions of the Order in the Regulated party's air emissions permit, nor is it necessary to continue the Order in effect.

# II. AGREEMENT AMENDMENT

NOW THEREFORE, pursuant to paragraph 20 of the Order, the MPCA and Regulated Party hereby agree to amend the Order to terminate it effective upon the date of the signature of the Commissioner of the MPCA or the Commissioner's representative below.

# BY THEIR SIGNATURES BELOW, THE UNDERSIGNED REPRESENT THAT THEY HAVE AUTHORITY TO AMEND THE ORIGINAL AGREMENT AND THAT THEY AGREE WITH THIS AMENDMENT AS WRITTEN

ARCELORMITTAL - MINORCA MINE INC.	STATE OF MINNESOTA POLLUTION CONTROL AGENCY
John Tuomi	Jeff J. Smith
General Manager	Division Director
United Taconite, LLC	Industrial Division
Dated:	Dated:



# Re: Minnesota Draft Supplemental SIP

John Summerhays to: Matthew Rau

01/03/2012 05:15 PM

This message has been replied to.

I saved this, but somehow my copy got corrupted. Could you send it to me? Thanks.

"Neuschler, Catherine (MPCA)"

attachment "Supplemental BART ... 12/13/2011 04:51:09 PM

From:

"Neuschler, Catherine (MPCA)" < Catherine. Neuschler@state.mn.us>

To:

Matthew Rau/R5/USEPA/US@EPA

Co:

John Summerhays/R5/USEPA/US@EPA, Kathleen Dagostino/R5/USEPA/US@EPA

Date:

12/13/2011 04:51 PM

Subject:

Minnesota Draft Supplemental SIP

[attachment "Supplemental BART Limits Submittal Draft.pdf" deleted by John Summerhays/R5/USEPA/US]

Matt, John, and Kathleen -

Attached to this email is the draft of Minnesota's Supplemental Regional Haze SIP, which includes the BART limits for the taconite facilities, a TR=BART determination, and a change to Minnesota's long-term strategy.

The public notice will be published in the State Register on Monday, December 19. The comment period will go until February 3. The SIP will be on the agenda for the MPCA Citizens' Board meeting in March, which is scheduled for March 27, 2012. (The public notice indicates this, and we will use that as the public meeting for the SIP.)

After finalization at the Board meeting, we will get you a final version as soon as possible in early April.

Let me know if you have questions or would like additional information. We can provide more detailed statistical analysis for the limits if that is needed.

### ~Catherine

Catherine Neuschler Air Policy Minnesota Pollution Control Agency 651-757-2607 catherine.neuschler@state.mn.us

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Fw: Minnesota Letter

Matthew Rau to: John Summerhays

Cc: Kathleen Dagostino

01/05/2012 05:50 PM

John,

Just letting you that letter to formally submit the regional haze supplement was signed today, January 5. I updated the proposed rule with the date before I submitted it for OGC/OAQPS review. A quick review of the letter suggests it is similar to the draft with the addition of a specific request to use Transport Rule as a BART alternative for the EGUs.

#### -- Matt

---- Forwarded by Matthew Rau/R5/USEPA/US on 01/05/2012 05:44 PM -----

From:

"Neuschler, Catherine (MPCA)" <catherine.neuschler@state.mn.us>

To:

Matthew Rau/R5/USEPA/US@EPA

Date:

01/05/2012 12:45 PM

Subject:

RE: Letter

And just after I pressed send on that email, my support staff walked up with the signed copy of the letter! It's going in the mail right now.

From: Neuschler, Catherine (MPCA)

Sent: Thursday, January 05, 2012 12:42 PM

To: Rau, Matt Subject: Letter

### Matt

I asked for the letter to be signed and mailed by tomorrow. An unsigned copy is attached.

Catherine Neuschler Air Policy Minnesota Pollution Control Agency 651-757-2607 catherine.neuschler@state.mn.us

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# Minnesota Pollution Control Agency

520 Lafayette Road North | St. Paul, Minnesota 55155-4194 | 651-296-6300 800-657-3864 | 651-282-5332 TTY | www.pca.state.mn.us | Equal Opportunity Employer

January 5, 2012

Ms. Cheryl Newton Director, Air and Radiation Division U.S. EPA, Region 5 77 West Jackson Boulevard (A-18J) Chicago, IL 60604-3507

Dear Ms. Newton:

Over the past two years, staff from the Minnesota Pollution Control Agency (MPCA) and your office have been working closely together on Minnesota's Regional Haze State Implementation Plan (SIP). In particular, there have been extensive discussions concerning the elements needed in order for U.S. Environmental Protection Agency (EPA) Region 5 to act on the Best Available Retrofit Technology (BART) determinations contained in Minnesota's SIP. The MPCA has been in the process of finalizing and developing enforceable documents to implement appropriate BART emission limits.

On November 9, 2011, the EPA entered into a consent decree with several groups concerning timelines for approval of Regional Haze SIPs. EPA agreed to sign a notice of promulgation for proposed approval of Minnesota's Regional Haze SIP (or promulgation of a Federal Implementation Plan) by January 17, 2012, with final approval by May 15, 2012.

On December 19, 2011, the MPCA placed on public notice a draft Supplemental Regional Haze SIP, which contains the necessary BART emission limits and enforceable documents. In addition, due to Minnesota's inclusion in the Cross-State Air Pollution Rule/Transport Rule, the Supplemental Regional Haze SIP includes a request that the Transport Rule substitute for BART for Minnesota's power plants. An update to Minnesota's long-term strategy is also included in the supplemental SIP.

A copy of the supplemental SIP was sent to your staff on December 13, 2011, and can also be found at <a href="http://www.pca.state.mn.us/index.php/view-document.html?gid=16991">http://www.pca.state.mn.us/index.php/view-document.html?gid=16991</a>.

The MPCA, therefore, requests that your staff officially review this draft prior to the January 17, 2012 deadline, in order to complete a parallel process with EPA's required review. The MPCA plans to complete the SIP public process at the state level and submit a final SIP to EPA by early April 2012, in order to allow EPA to meet the May 15, 2012 deadline.

Sincerely,

J. David Thornton Assistant Commissioner

JDT/CN:jab

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Re: Fw: Minnesota Letter 

John Summerhays to: catherine.neuschler
Cc: Kathleen Dagostino, Matthew Rau

01/06/2012 11:21 AM

We're assuming the signature date is January 5, but I wanted to confirm. Is that in fact the date it was signed? We're putting the date in the Federal Register that we're aiming to sign in a little over a week.

We got a call from Trent Wickman wanting to talk about your draft submittal. We'll fill you in if and when we talk. Are you having as much fun as we are?

Matthew Rau John Just letting you that letter to formally subm. 01/05/2012 05:50:40 PM

From:

Matthew Rau/R5/USEPA/US

To: Cc: John Summerhays/R5/USEPA/US@EPA Kathleen Dagostino/R5/USEPA/US@EPA

Date: Subject: 01/05/2012 05:50 PM Fw: Minnesota Letter

John,

Just letting you that letter to formally submit the regional haze supplement was signed today, January 5. I updated the proposed rule with the date before I submitted it for OGC/OAQPS review. A quick review of the letter suggests it is similar to the draft with the addition of a specific request to use Transport Rule as a BART alternative for the EGUs.

#### -- Mat

---- Forwarded by Matthew Rau/R5/USEPA/US on 01/05/2012 05:44 PM ----

From:

"Neuschler, Catherine (MPCA)" <catherine.neuschler@state.mn.us>

To:

Matthew Rau/R5/USEPA/US@EPA

Date:

01/05/2012 12:45 PM

Subject:

ect: RE: Letter

And just after I pressed send on that email, my support staff walked up with the signed copy of the letter! It's going in the mail right now.

From: Neuschler, Catherine (MPCA)

Sent: Thursday, January 05, 2012 12:42 PM

To: Rau, Matt Subject: Letter

### Matt -

I asked for the letter to be signed and mailed by tomorrow. An unsigned copy is attached.

Catherine Neuschler Air Policy Minnesota Pollution Control Agency 651-757-2607 catherine.neuschler@state.mn.us

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Re: Minnesota Regional Haze Rule Matthew Rau to: Benjamin Giwojna

Cc: Monika Lacka, Pamela Blakley, Diane Nelson

01/09/2012 09:56 AM

Ben,

Great. I have put together a paragraph with a quick overview of the proposed rule. I do not want to commit you and Monika to certain action, so please add what you will do. I can certainly will let you know when the rule is published, so that info can be passed along to the tribes. Do we want to share the rule once signed by the RA? It can be two weeks after signature for the rule to be published. I can help with a conference call, with informal comments, and will things related to regional haze.

Here is the rule summary:

EPA will issue a proposed rule on the Minnesota regional haze plan to meet its January 17, 2012 consent decree obligation. EPA is acting on the regional haze plan submitted on December 30, 2009 and the January 5, 2012 supplement. Minnesota is now using participation in the Transport Rule, also known as the Cross-State Air Pollution Rule, program as satisfying the BART requirements for its power plants. The state also provided specific emission limits for the taconite ore processing facilities. EPA expects to propose approval of all regional haze elements, but the agency is still considering recent court action on the Transport Rule. Still, EPA intends to issue a proposed rule by January 17, 2012. This rule will be published shortly after signature in the Federal Register. It will include a 30-day comment period.

Thanks,

Matt

6-6524

From:

Benjamin Giwojna/R5/USEPA/US Matthew Rau/R5/USEPA/US@EPA Monika Lacka/R5/USEPA/US@EPA

To: Cc: Date:

01/09/2012 08:25 AM

Subject:

Re: Minnesota Regional Haze Rule

# Hi Matt:

Sorry for the delayed response. I took leave around both holiday weekends and have been out of the office since December 22. Anyway, I think a good way to handle this would be to put together a paragraph or two on the proposed rule and blast email it out to the tribes, highlighting that there will be a comment period and subsequent opportunity to provide input. We can also offer to have additional dialogue via a conference call and also discuss this on our next monthly air call with the tribes, which I believe we have scheduled for Thursday, January 26. If you guys can put a paragraph or two on the rule together, we can get the word out to the appropriate tribes for you.

I'm working from home today. Feel free to give me a call if you wish to discuss this further. I can be reached at 630-783-9837 and will be on the clock until 5:30 PM.

Thanks! Ben

-----Matthew Rau/R5/USEPA/US wrote: ----To: Benjamin Giwojna/R5/USEPA/US@EPA

From: Matthew Rau/R5/USEPA/US

Date: 01/04/2012 11:25AM

Cc: Pamela Blakley/R5/USEPA/US@EPA, Diane Nelson/R5/USEPA/US@EPA

Subject: Minnesota Regional Haze Rule

Ben,

A proposed rule on the Minnesota regional haze plan must be signed by January 17, 2012 to meet a consent decree deadline. Minnesota will send the final material I need this week and I will finish the rule.

My question is to do with the tribal consulting requirements for this rule, what level of consulting is needed for this proposed rule? As this is a proposed rule with a comment period, can we just inform the tribes of the rule and alert them to comment period dates once known? If we need to provide the tribes with information, please let me know and I will provide what you need right away.

-- Matt 6-6524

# Fw: Minnesota Haze Letter

Matthew Rau to: Pamela Blakley

01/10/2012 12:02 PM

Pam,

The letter from Minnesota making a supplemental submission on regional haze is in the message below . The letter was signed on January 5, 2012.

# -- Matt

---- Forwarded by Matthew Rau/R5/USEPA/US on 01/10/2012 12:01 PM -----

From:

"Neuschler, Catherine (MPCA)" <catherine.neuschler@state.mn.us>

To:

Matthew Rau/R5/USEPA/US@EPA

Date:

01/05/2012 12:42 PM

Subject:

Letter

#### Matt.

I asked for the letter to be signed and mailed by tomorrow. An unsigned copy is attached.

Catherine Neuschler Air Policy Minnesota Pollution Control Agency 651-757-2607 catherine.neuschler@state.mn.us



Request for Review of SIP final.docx

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Re: Haze Rulemaking 🖺

Matthew Rau to: Neuschler, Catherine (MPCA)

Cc: John Summerhays

01/17/2012 05:45 PM

### Catherine,

The proposed rule was signed today by Regional Administrator Susan Hedman. The rule is in process to the Office of the Federal Register. I am hoping it will publish before the end of the month.

#### -- Matt

From:

"Neuschler, Catherine (MPCA)" <catherine.neuschler@state.mn.us>

To:

Matthew Rau/R5/USEPA/US@EPA, John Summerhays/R5/USEPA/US@EPA

Date:

01/17/2012 03:42 PM

Subject:

Haze Rulemaking

# Hi Matt and John -

I don't want to slow you down as I'm sure you're working on finalizing the notice of proposed rulemaking. But I just wanted to let you know that I'm slated to give two air updates this week that include haze information - tomorrow at 10 am and Thursday at 2 pm - and I know the audiences are very interested in the EPA process and what any notice will say. If you can let me know tomorrow morning where we stand with the notice (or send a copy?) that would be great.

### Thanks.

Catherine Neuschler
Air Policy
Minnesota Pollution Control Agency
651-757-2607
catherine.neuschler@state.mn.us

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